

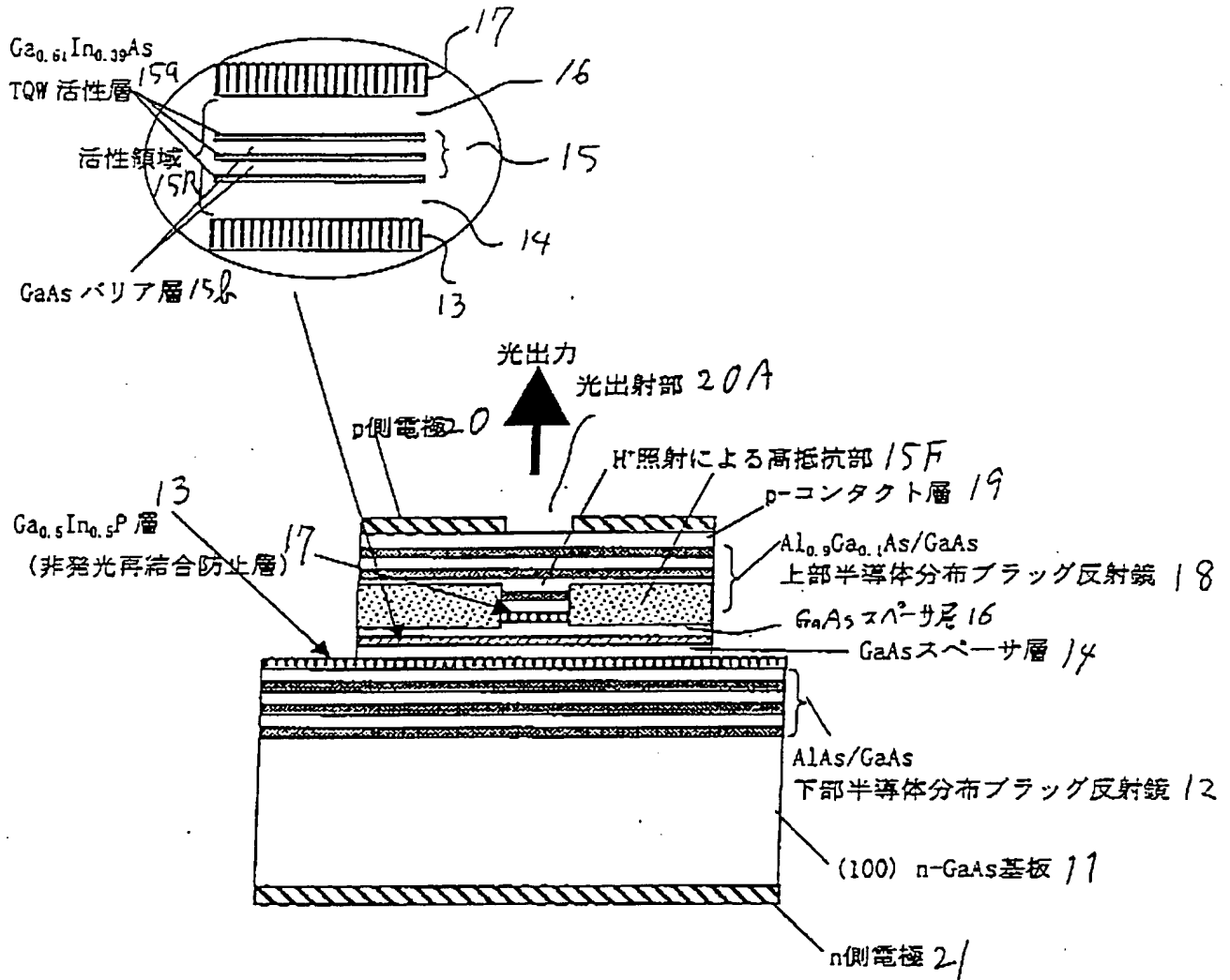
JP0109564

110-

図

図1

FIG 1

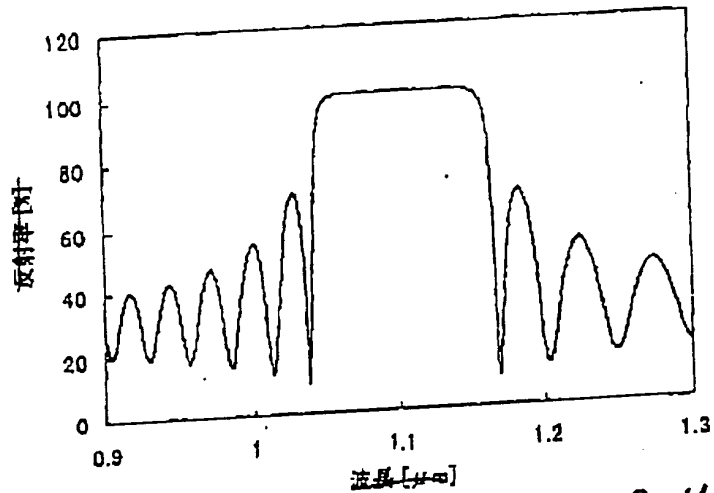


10085204.022602

FIG 2

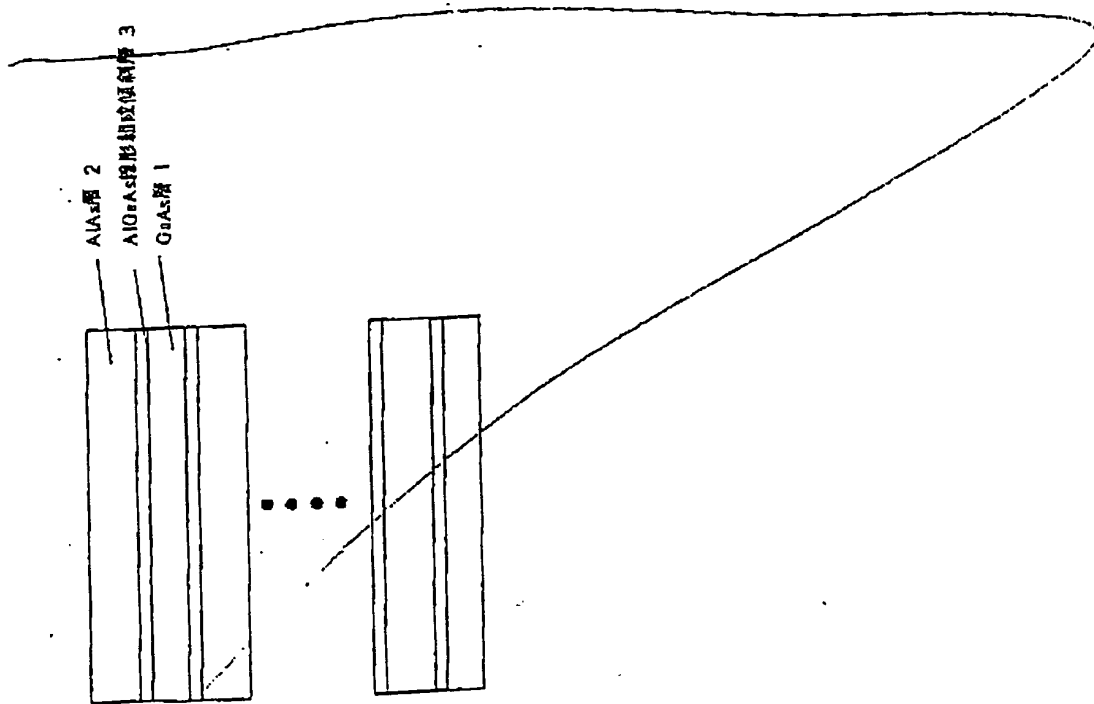
[2]

REFLECTANCE[%]



WAVELENGTH [μm]

[2]



[3]

209220" 4025800T

[WA]
3

FIG 3

18 (12)

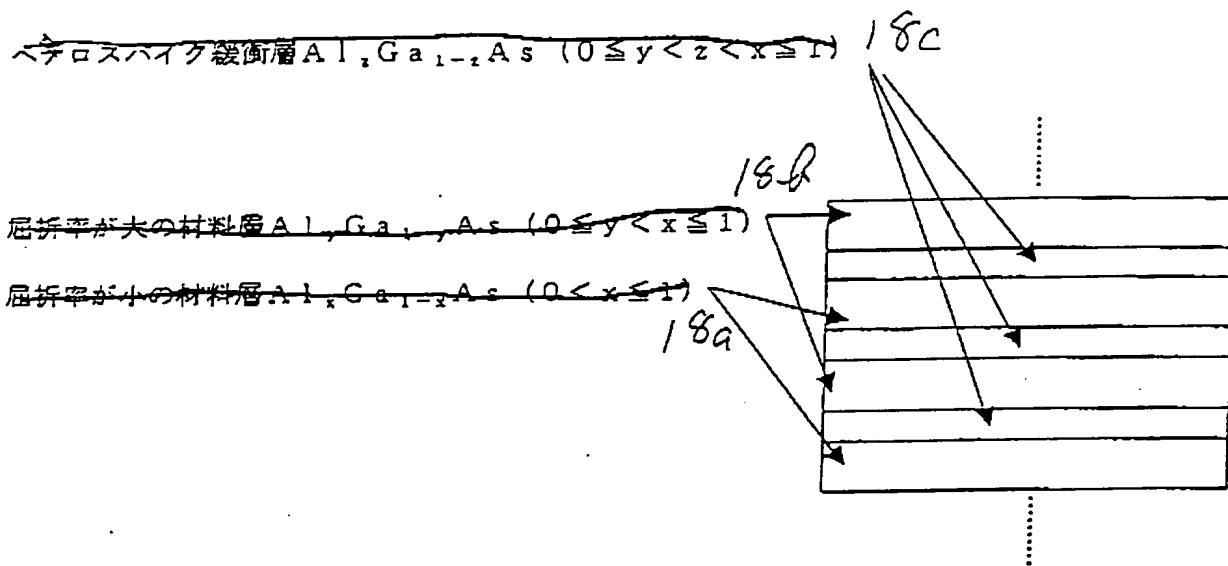
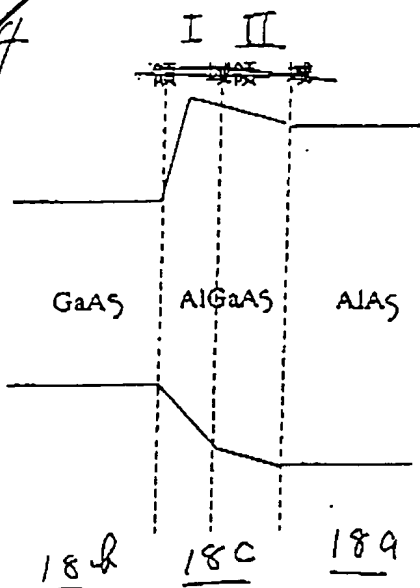


図2

209220"4025800T
10085204.022602

~~[12] 3~~
4

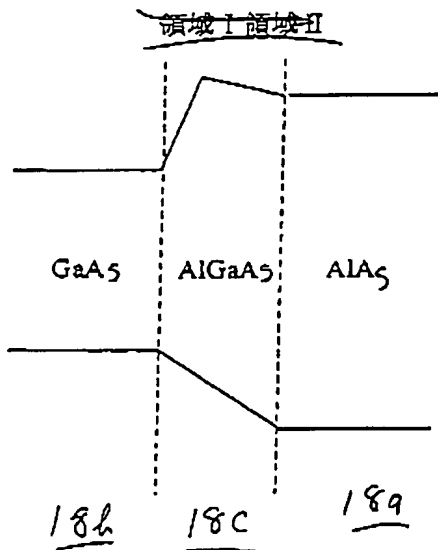
FIG 4



~~[12] 5~~
4

~~图 3~~

FIG 5



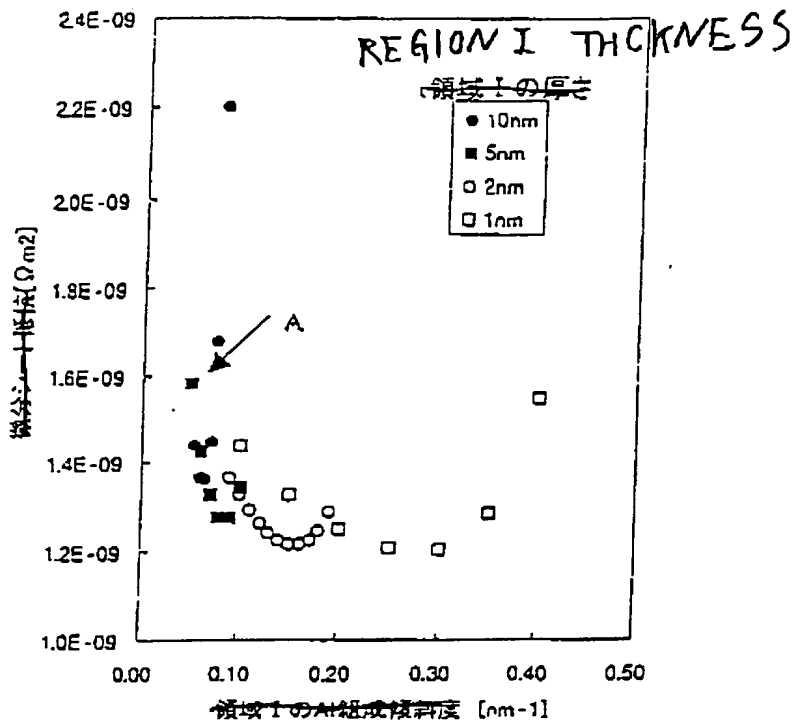
~~图 4~~

209220 10258001
10085204 022602

~~[X] 0~~

FIG 6

DIFFERENTIAL SHEET RESISTANCE



COMPOSITIONAL GRADIENT IN I

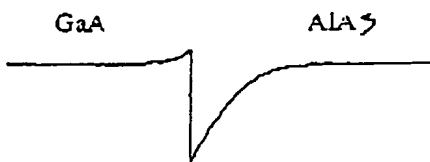
~~[X] 7~~

FIG 7

~~[X] 5~~

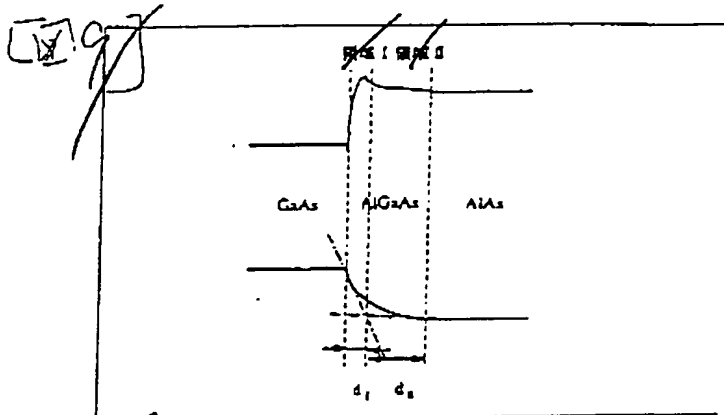
~~[X] 8~~

FIG 8

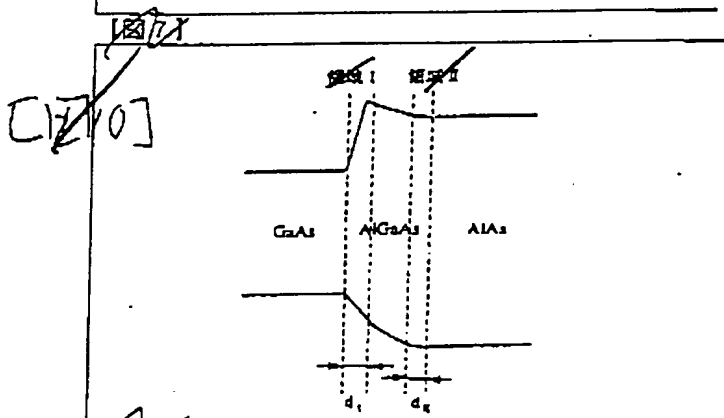


~~[X] 6~~

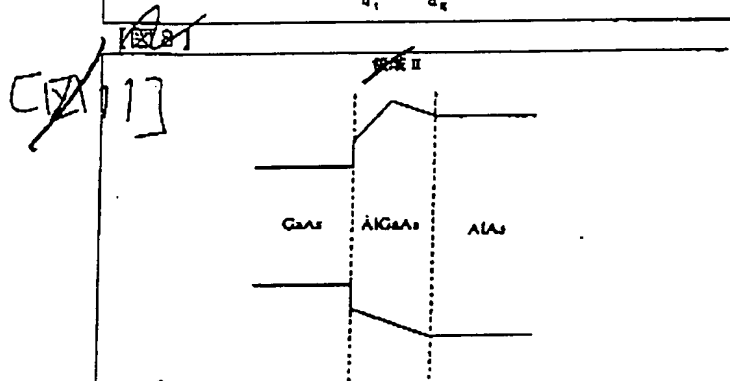
~~[X] 7~~



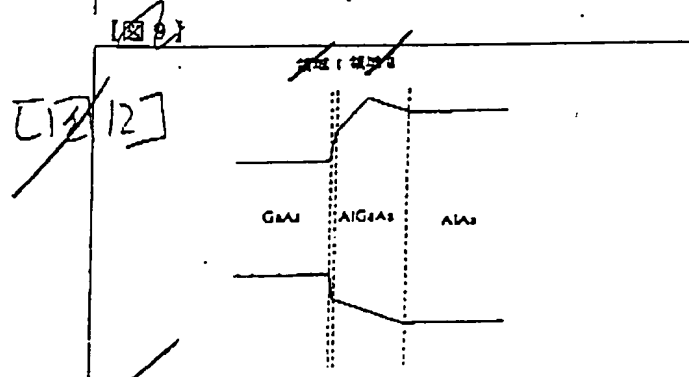
F1G9



F1G10



F1G11

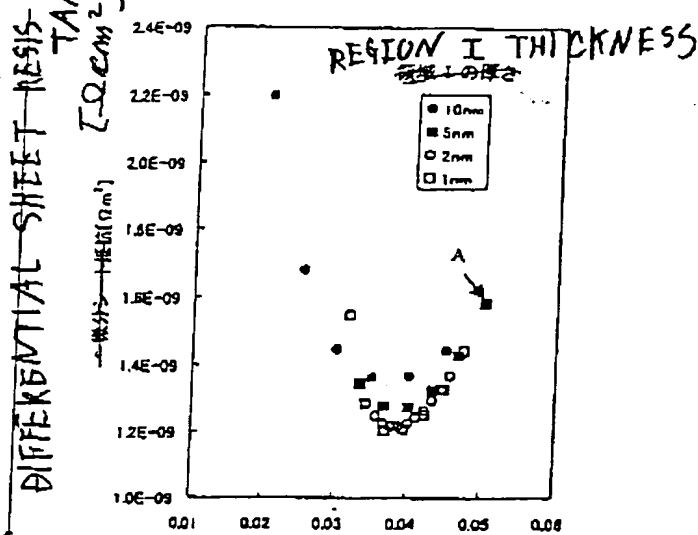


F1G12

~~[101]~~

2022040258001

FIG 13



209220 4025802

FIG 14

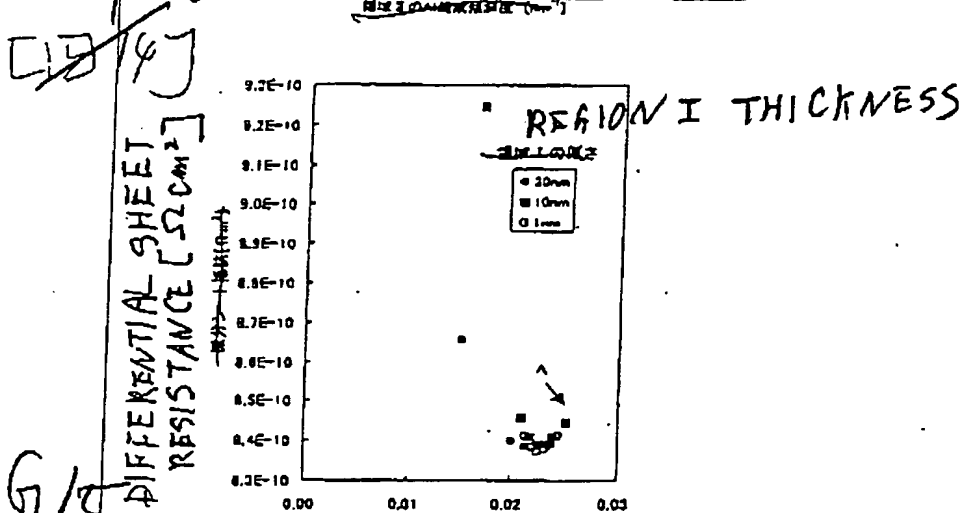
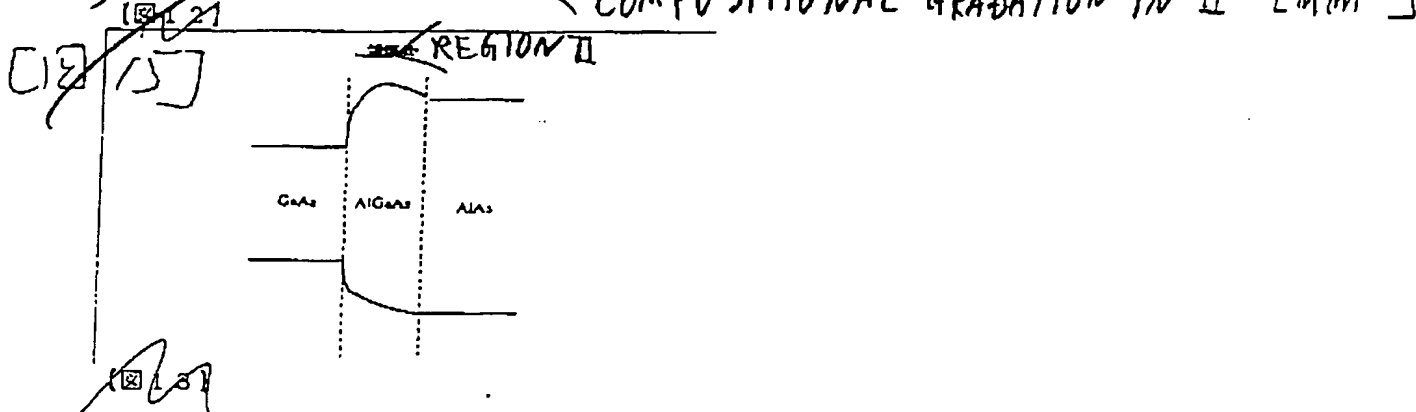
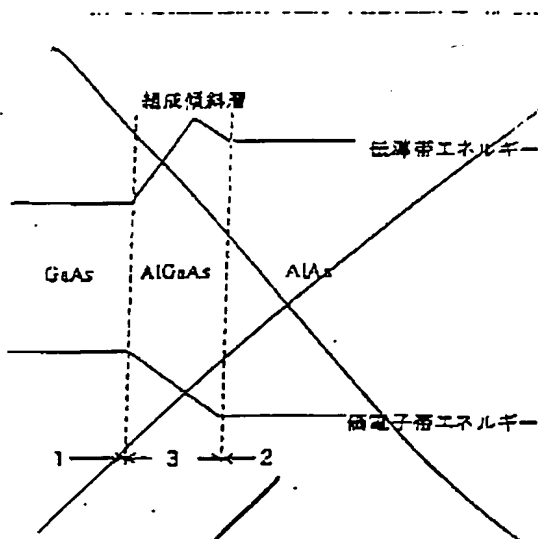
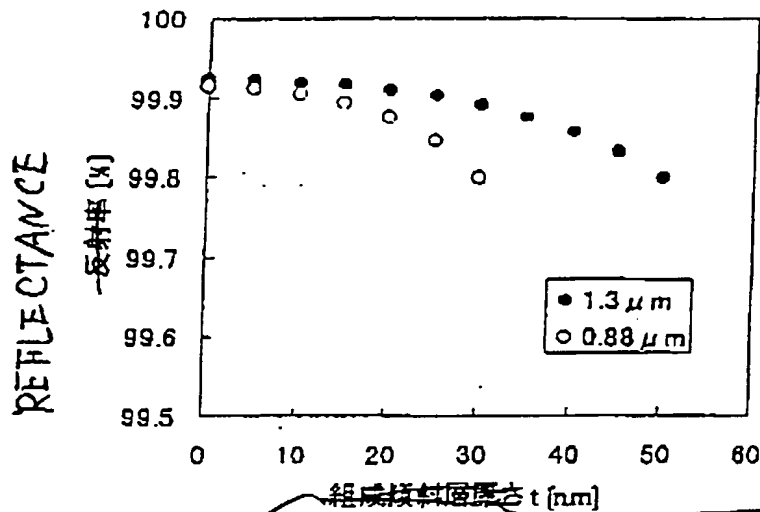


FIG 15





[図 4] [2/16] FIG 16

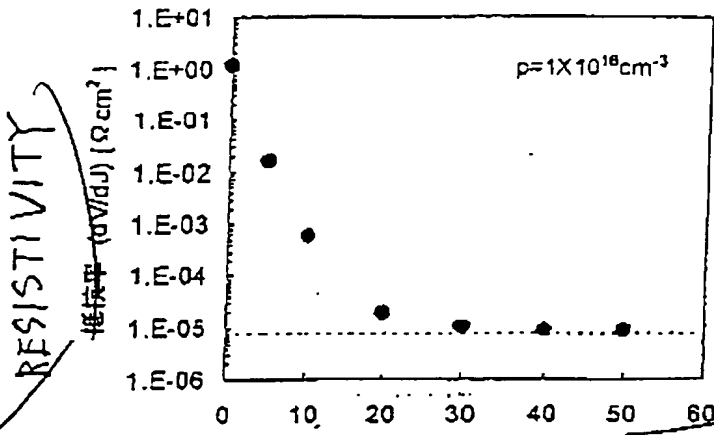


[図 5]

GRADIENT LAYER THICKNESS

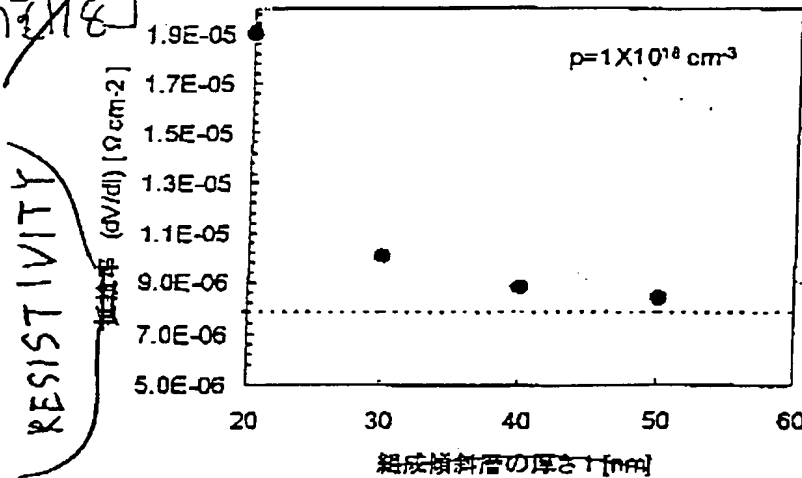
209220 4025802

~~[17]~~ — FIG 17



組成傾斜層の厚さ t [nm]
COMPOSITIONAL GRADATION LAYER THICKNESS
t [nm]

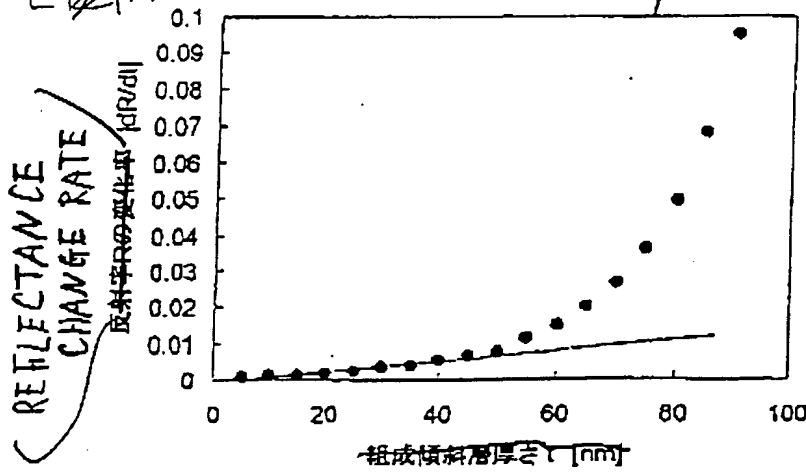
FIG 18



COMPOSITIONAL GRADATION LAYER
THICKNESS t [nm]

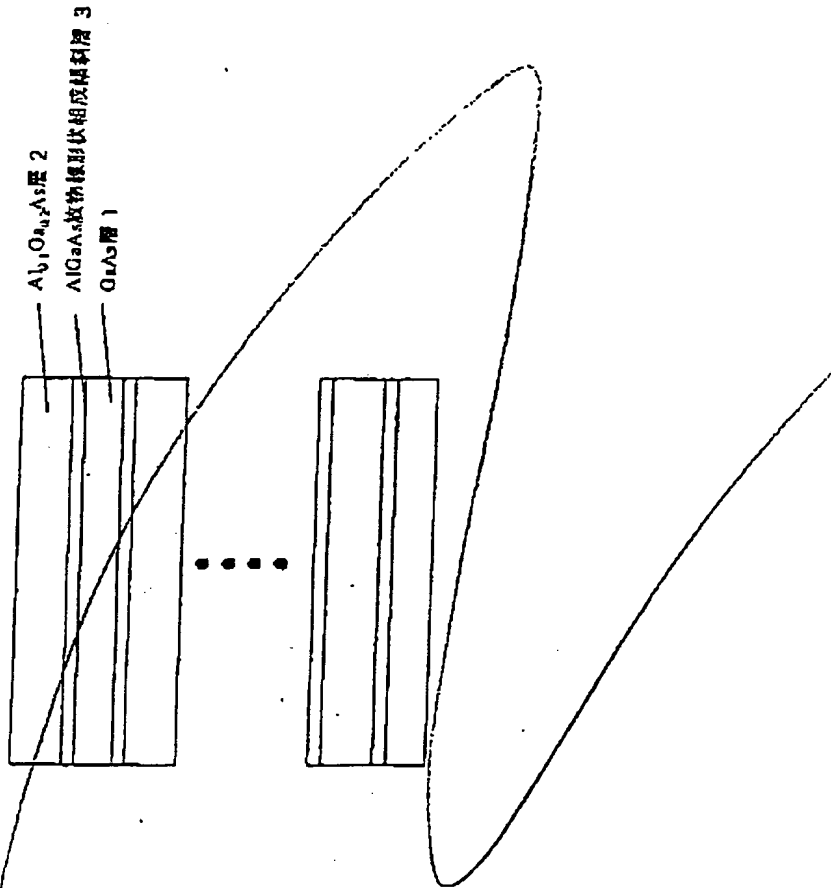
209220-40258007
10085204-022602

FIG-19



COMPOSITIONAL GRADATION LAYER THICKNESS [nm]

【図8】

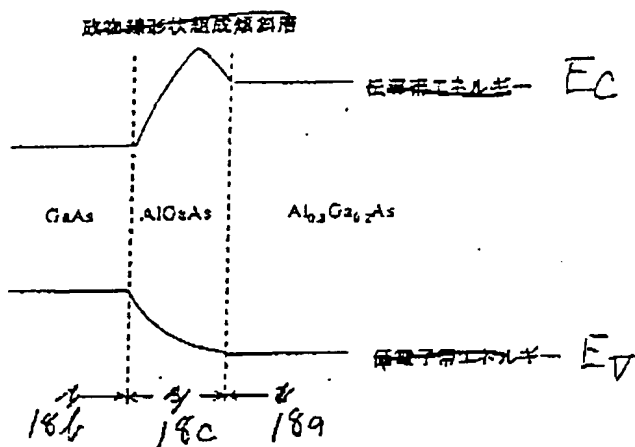


【図9】

209220" 40258001

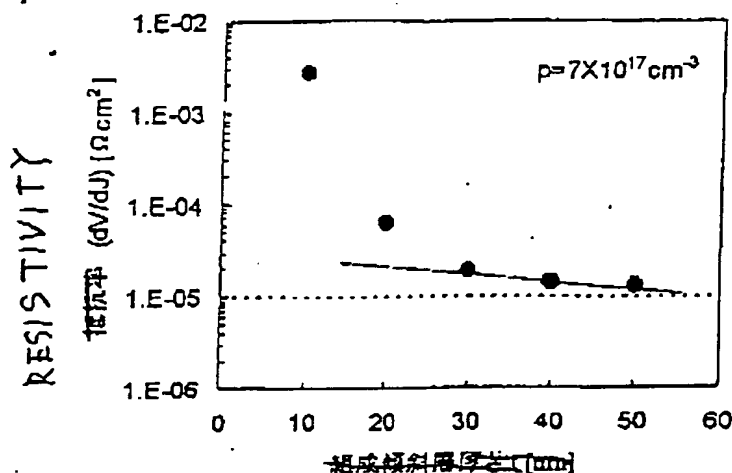
[図20]

FIG20



[図21]
[図10]

FIG21



COMPOSITIONAL GRADATION LAYER THICKNESS

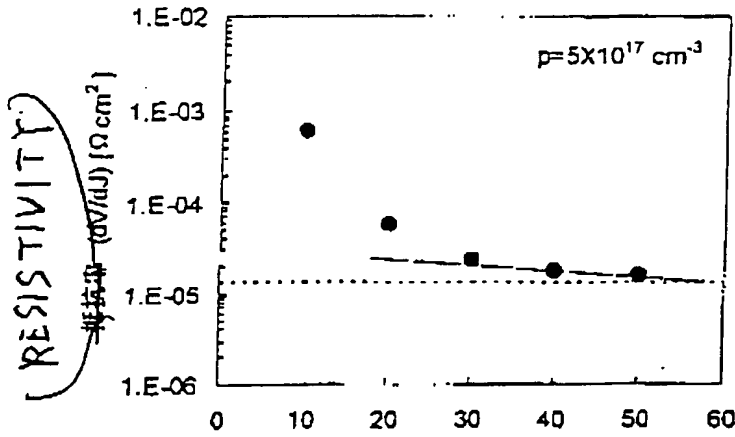
[μm]

[図11]

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~~[12] 22~~

FIG 22



~~[13] 23~~
[図 13]

COMPOSITIONAL GRADATION LAYER THICKNESS
[mm]

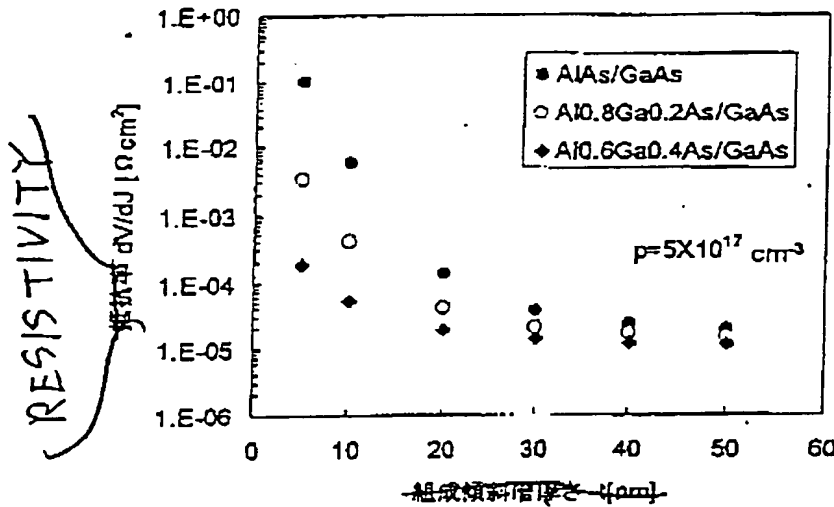


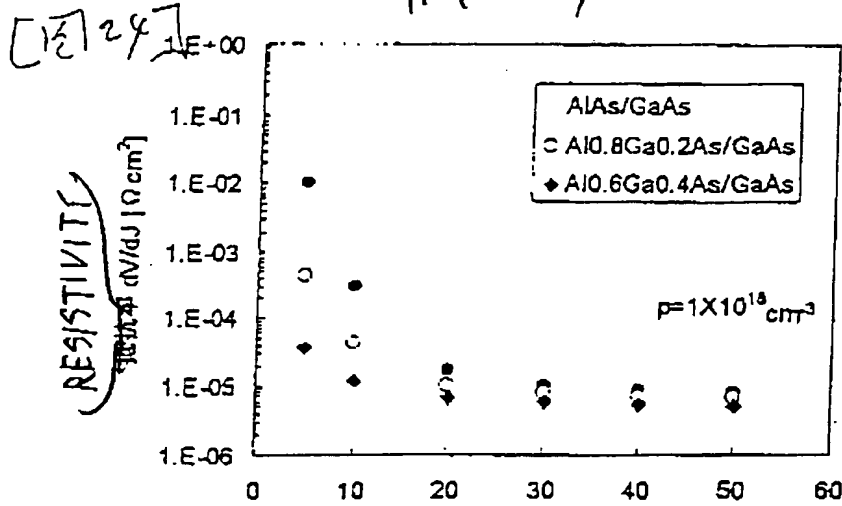
FIG 23

[図 13]

COMPOSITIONAL GRADATION LAYER
THICKNESS [mm]

209220 4025802 10085204 022602

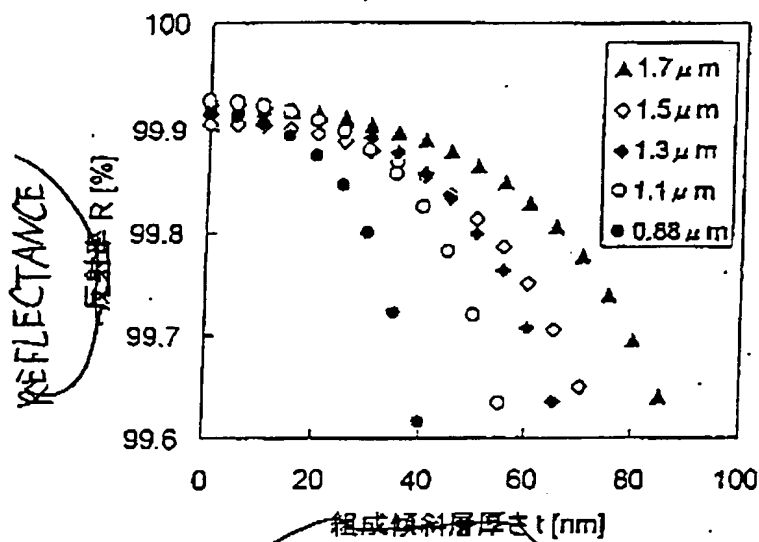
FIG 24



[FIG 25]

COMPOSITIONAL GRADATION LAYER THICKNESS

FIG 25



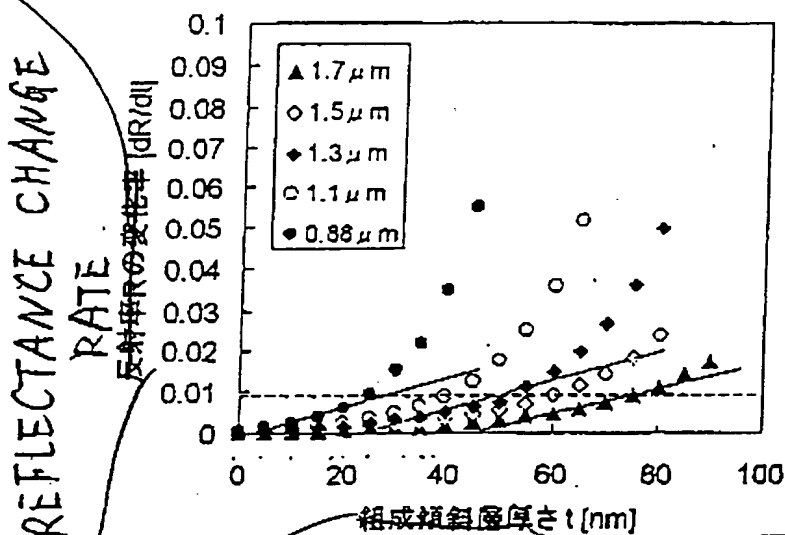
COMPOSITIONAL GRADATION LAYER THICKNESS

[FIG 15]

209220"4025800T 10085204.022602

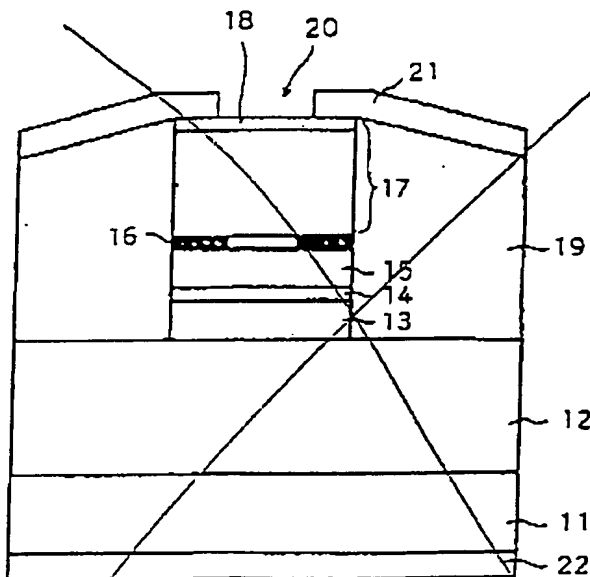
[FIG 26]

FIG 26



COMPOSITIONAL GRADATION LAYER THICKNESS

[FIG 16]



[FIG 17]

209220"40258001

10085204"022602

[18] 10

27

FIG 27

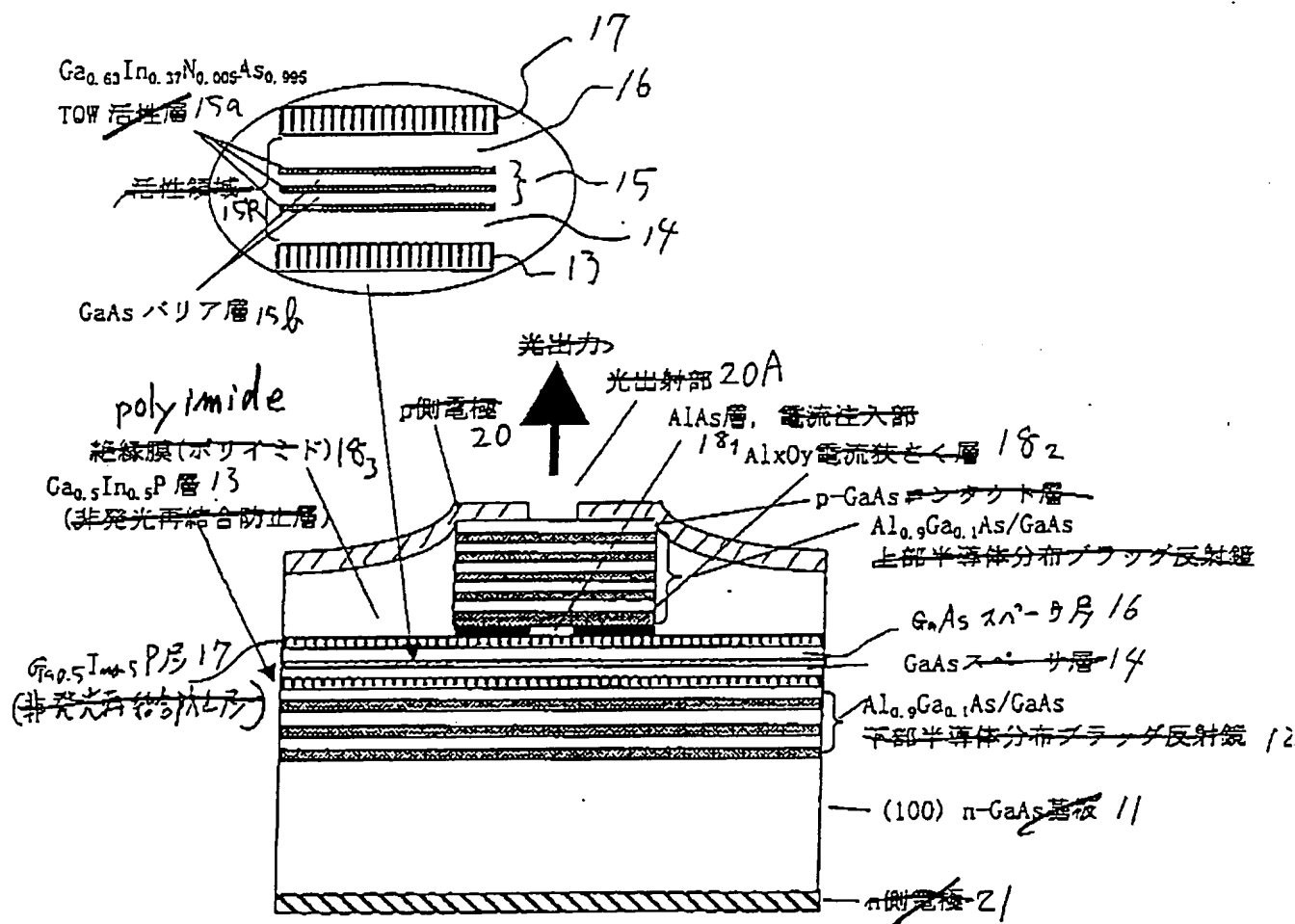


図 10

10085204, 022602

28
~~[12]~~

FIG 28

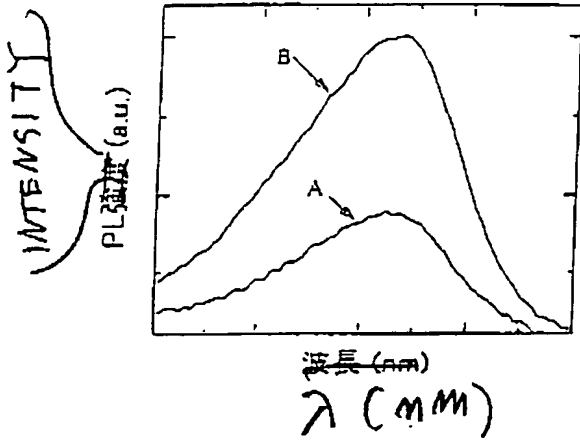


図 1 1

29
~~[12]~~

FIG 29

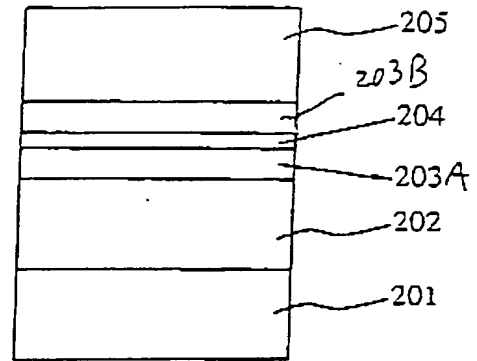


図 1 2

30
~~[12]~~

FIG 30

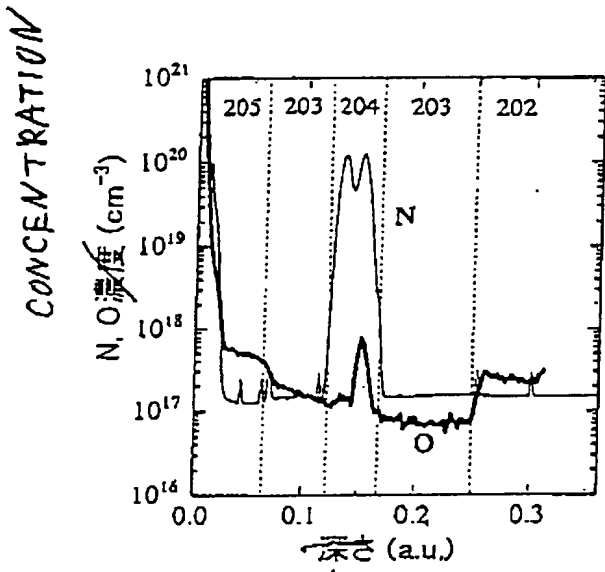
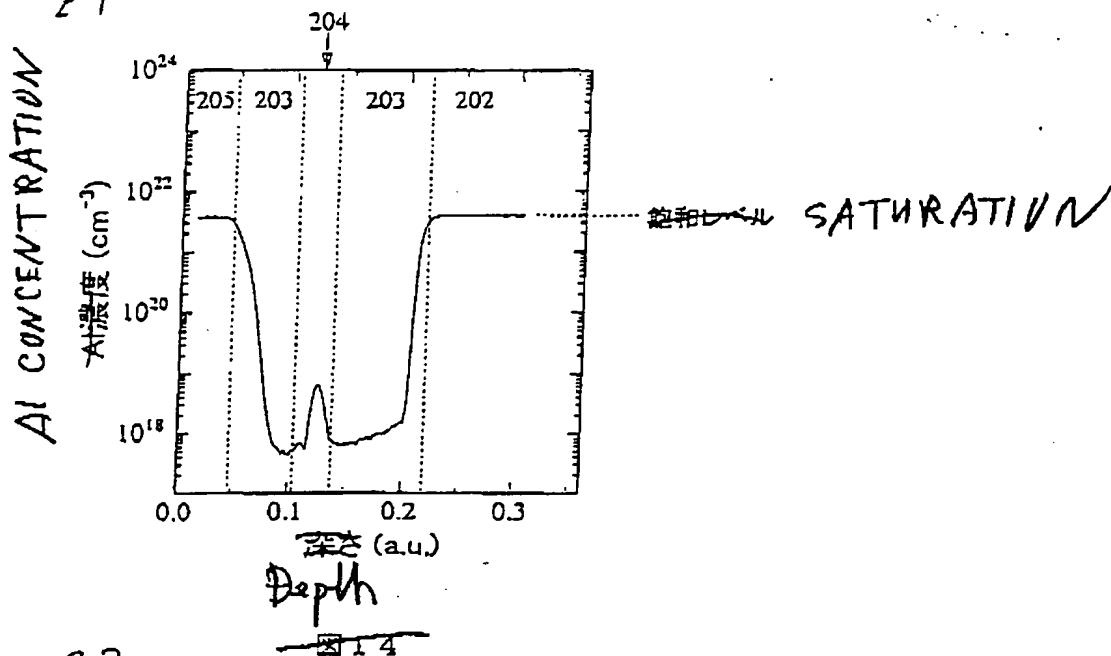


図 1 3

209220 40258001

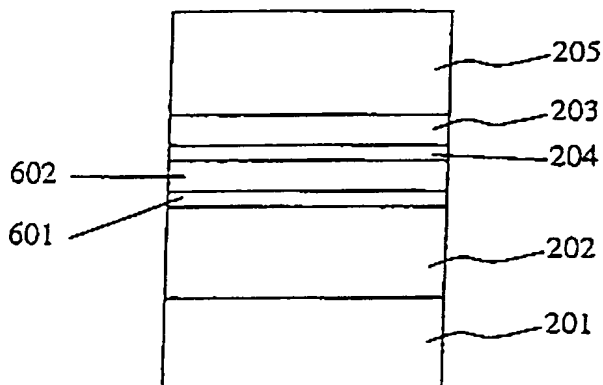
[~~FIG 31~~]
 31

FIG 31



[~~FIG 32~~]
 32

FIG 32



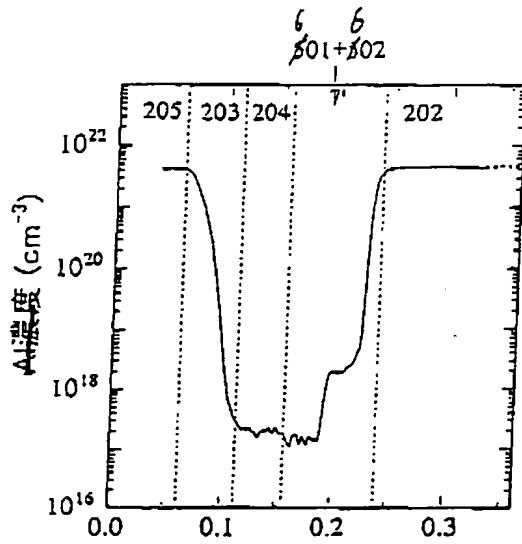
[~~FIG 32~~]
 32

10085204, 022602

33
[~~図 16~~]

F/G 33

Al CONCENTRATION



飽和レベル

SATURATION

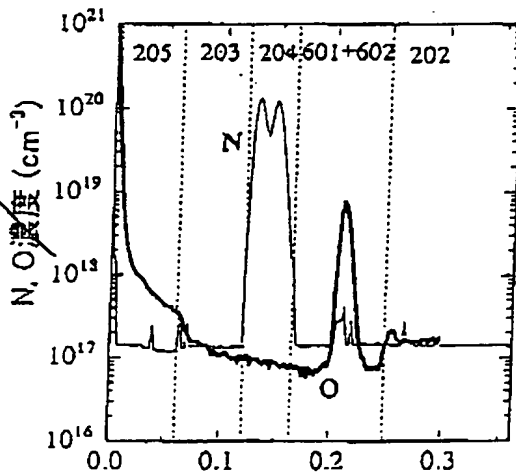
Depth

~~図 16~~

34
[~~図 17~~]

F/G 34

CONCENTRATION



Depth

~~図 17~~

209220" 40258001

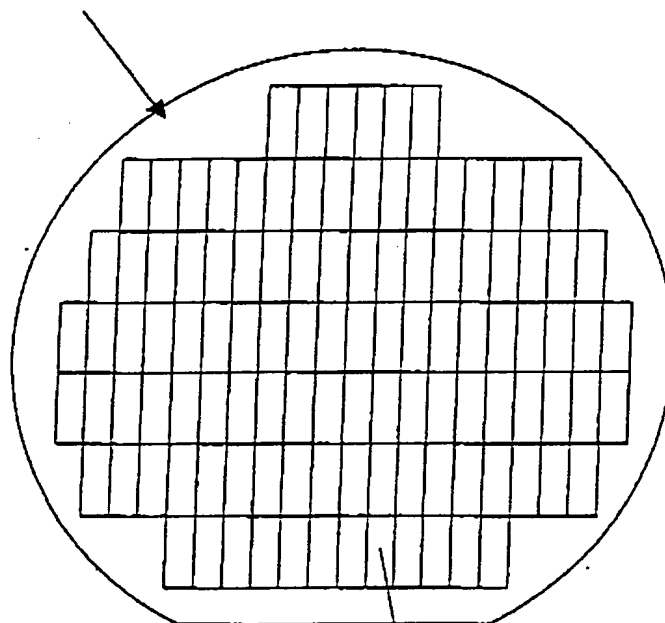
10085204 022600

35
☒ 18 ☐

3

FIG 35

~~ドーパントを形成した (100) n-GaAs ウェハ~~ 31



~~ドーパント層~~ 32

図 18

10085204, 022602

36
~~[図 18]~~

F/G36

33

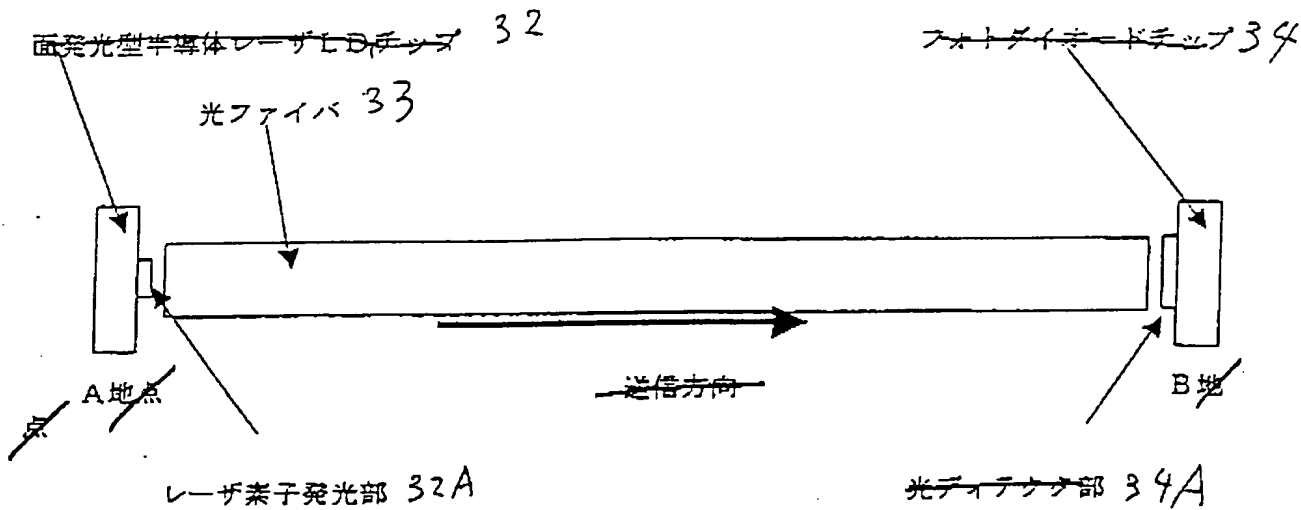


図 19

37
~~[図 20]~~

F/G37

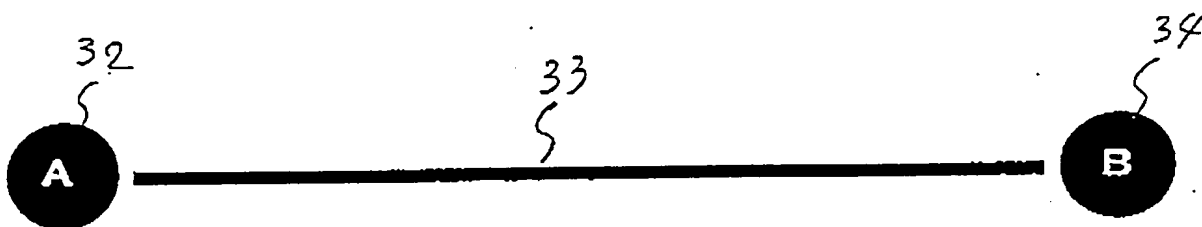


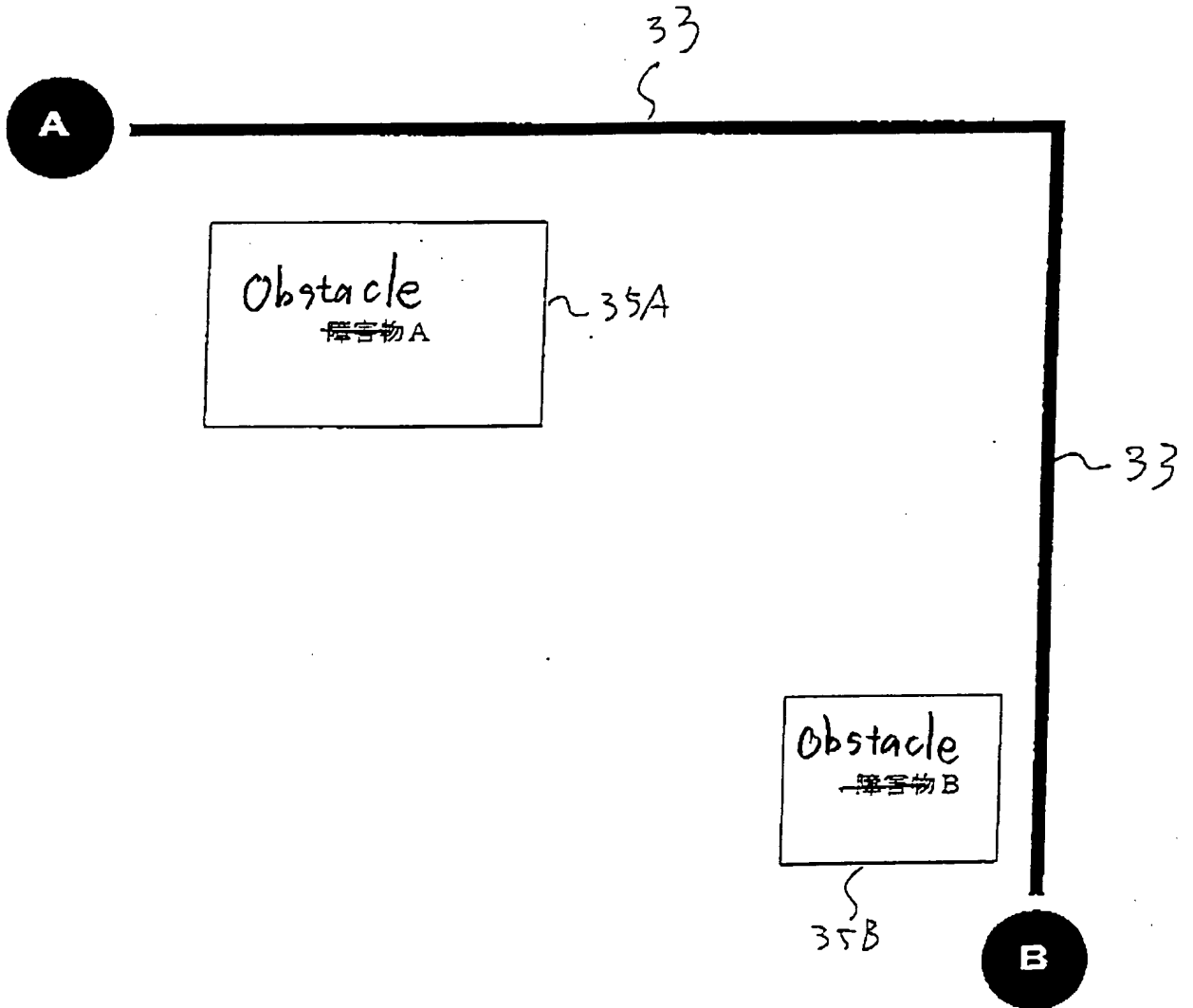
図 20

10085204-022602

43

38
[21]

FIG 38

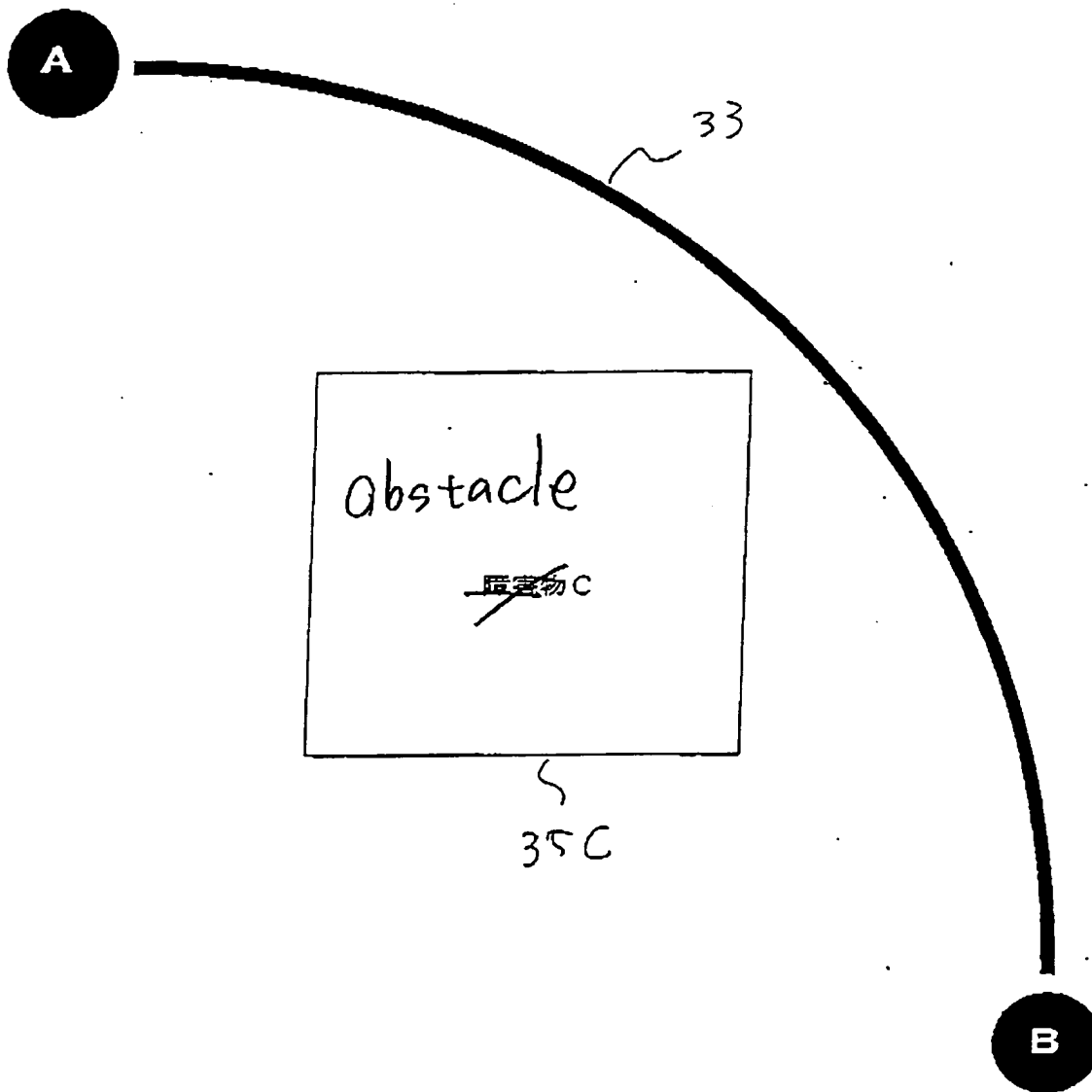


10085204.022602

3

31
[13] 22

FIG 39



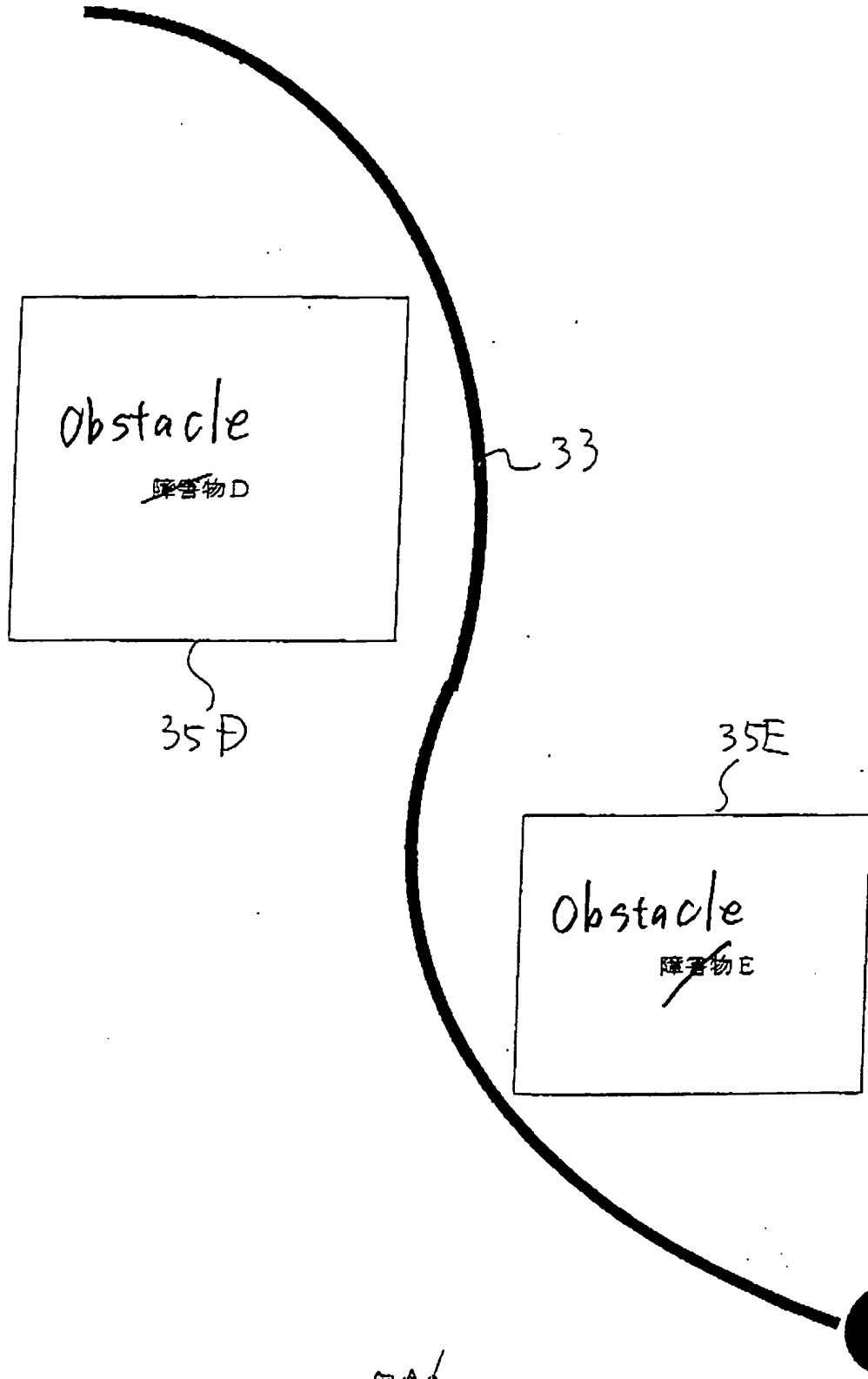
10085204.022602

22

~~FIG 40~~

FIG 40

3



10085204.022602

4/
 20

FIG 4/

9/4

面発光型半導体レーザユニット 32

光ファイバ F1

反射部材 R

半導体発光部 32A

送信方向

送信方向

光ファイバ F2

光ファイバ検出部 34A

フォトダイオードユニット 34

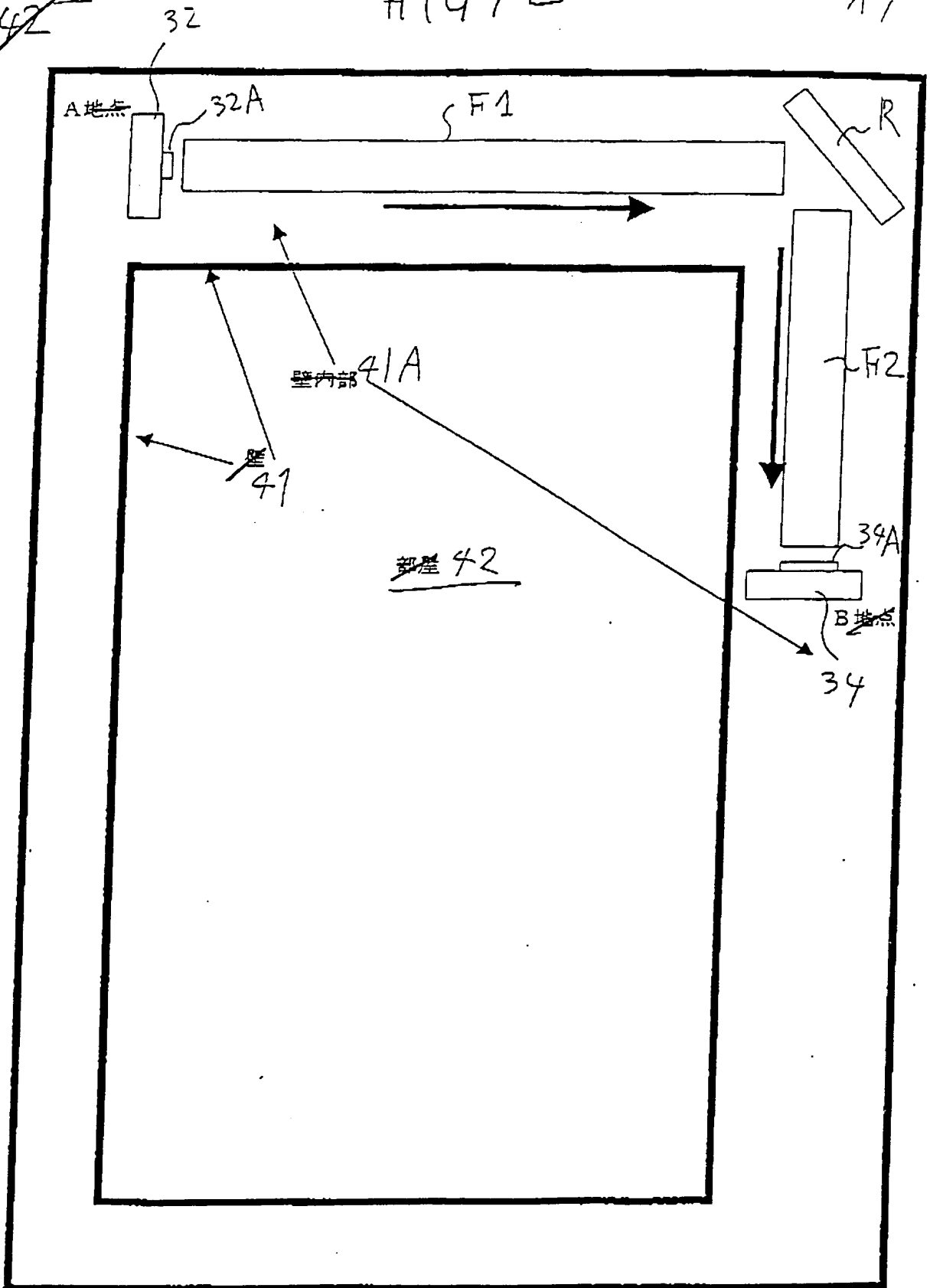
図 2

10085204.022602

L181 42
42

HIG42

44



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225

□ 26 / □
43

F/G 43

44

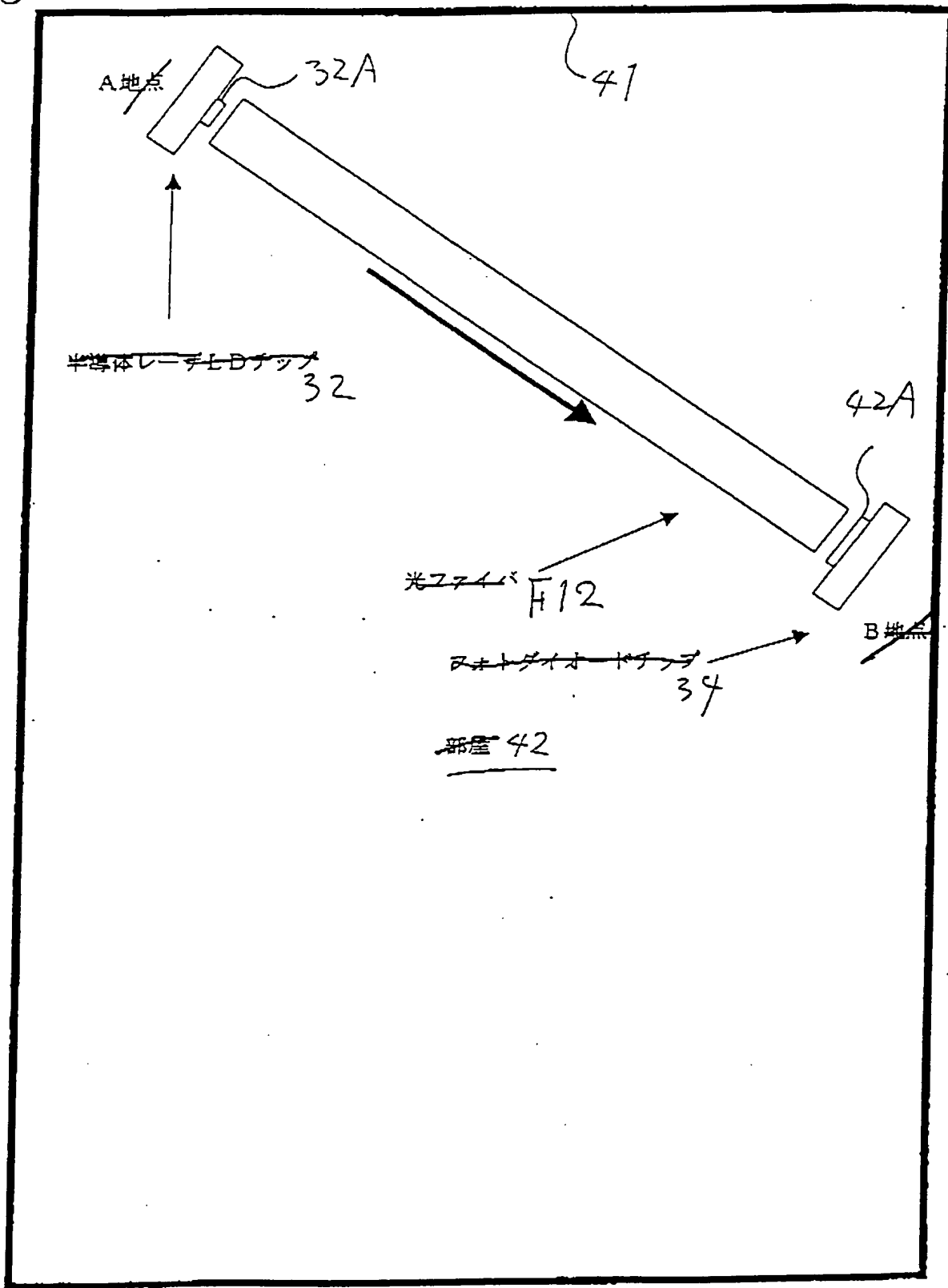


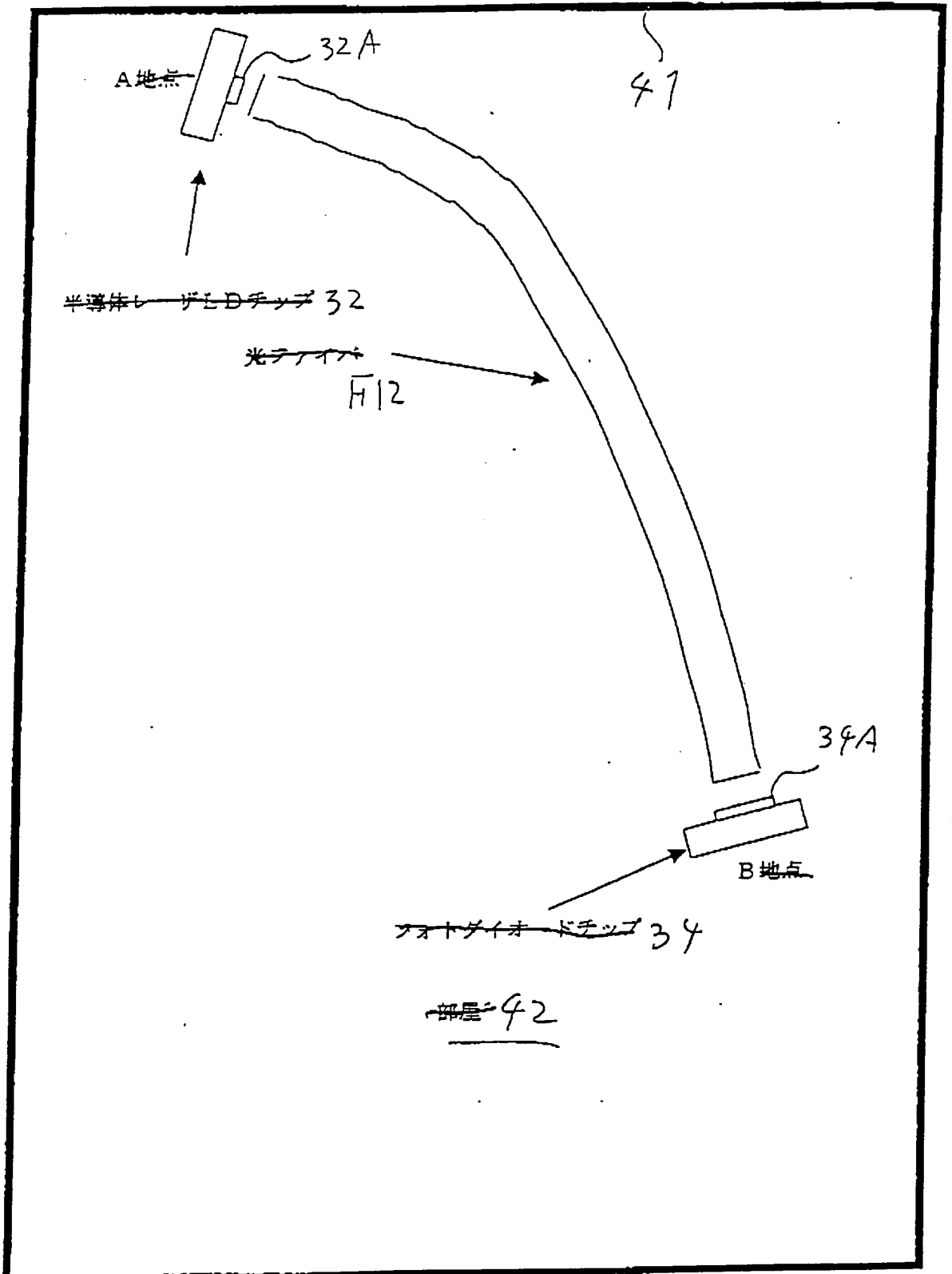
図 26

10085204.022602

18127
 44

FIG 44

カ



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図 27

45
 45
 45

FIG 45

44

面発光型半導体レーザーチップ 32

フォトダイオードチップ 34

レーザー発光部 32A

光検出部 34A

送信方向

46
 46
 46

面発光型半導体レーザーチップ 32

FIG 46

反射部材 R

送信方向

レーザー発光部 32A

送信方向

光検出部 34A

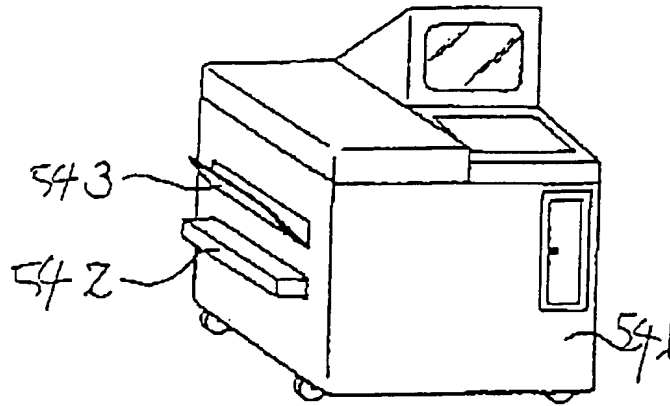
フォトダイオードチップ 34

2.9
 1a

10085204.022602

~~47~~
~~[280]~~ F/G47

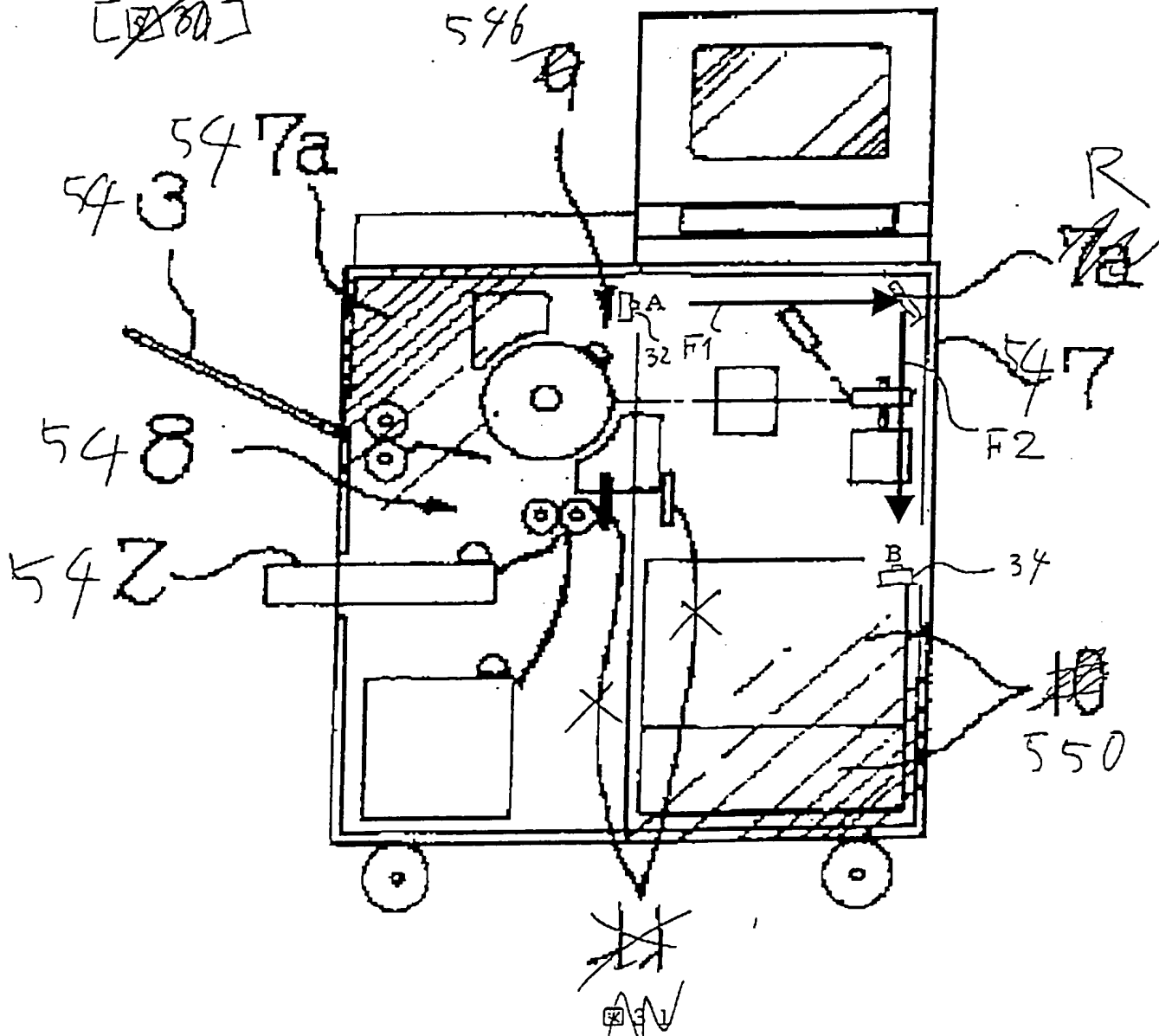
15



F/G48

~~48~~
~~[280]~~

546



10085204.022602

49
~~[12/32]~~

45

FIG 49 551

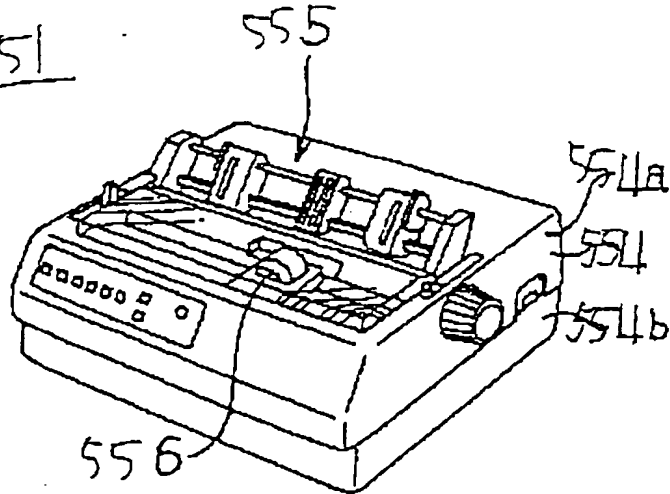
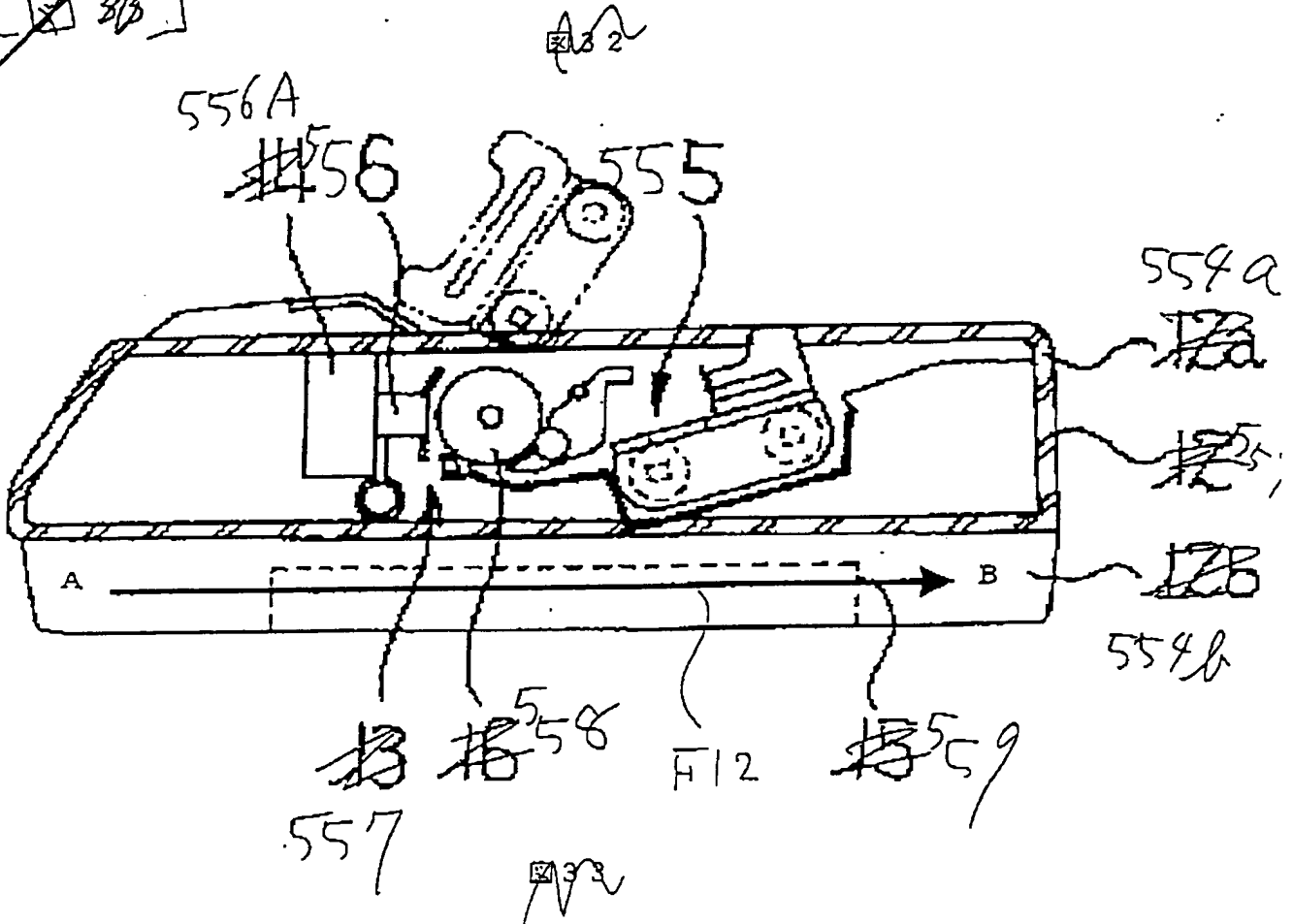


FIG 50

50
~~[12/33]~~



10085204.022602

6

51
~~FIG 34~~

FIG 51

面発光型半導体レーザLDチップ 32

反射部材 R

カバー 32B

送信方向

F1

半導体発光部 32A

A

送信方向

F2

カバー 34B

光アイソレータ部 34A

フォトダイオードチップ 34

B

~~FIG 34~~

10085204.022602

54
~~35~~

FIG 52

7
2

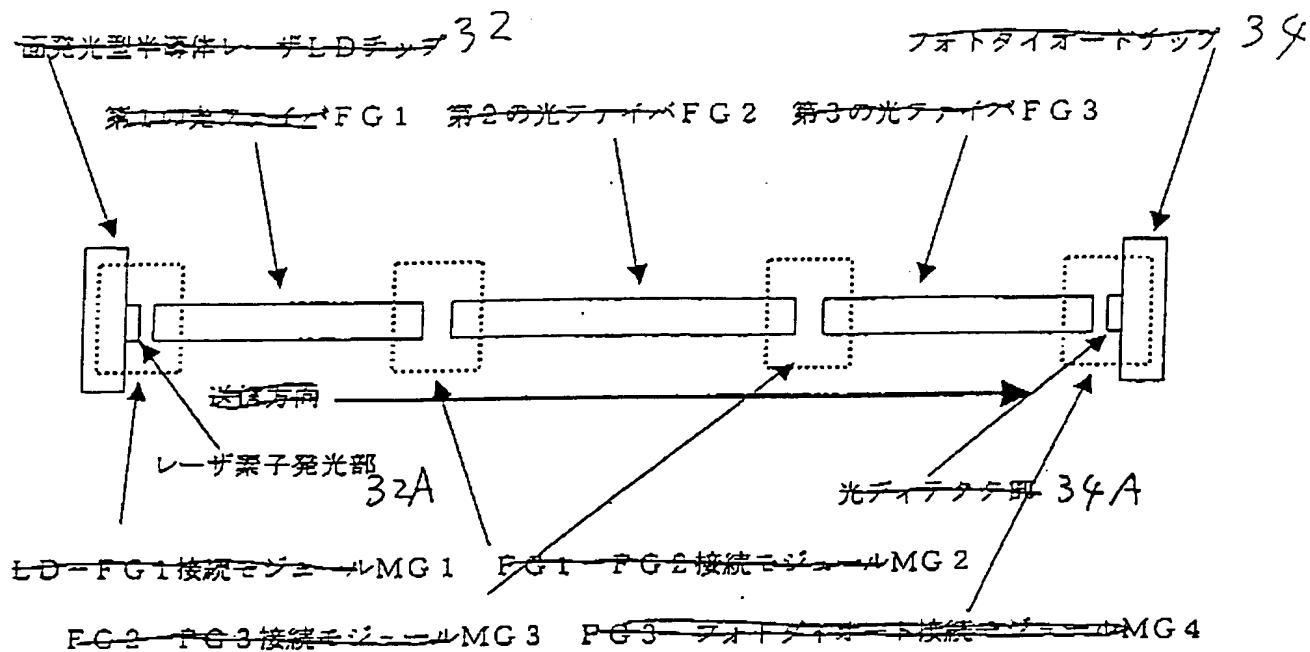


図 85

10085204.022602

図36

FIG 53

37

32
面発光型半導体レーザLDチップ

フォトダイオードチップ

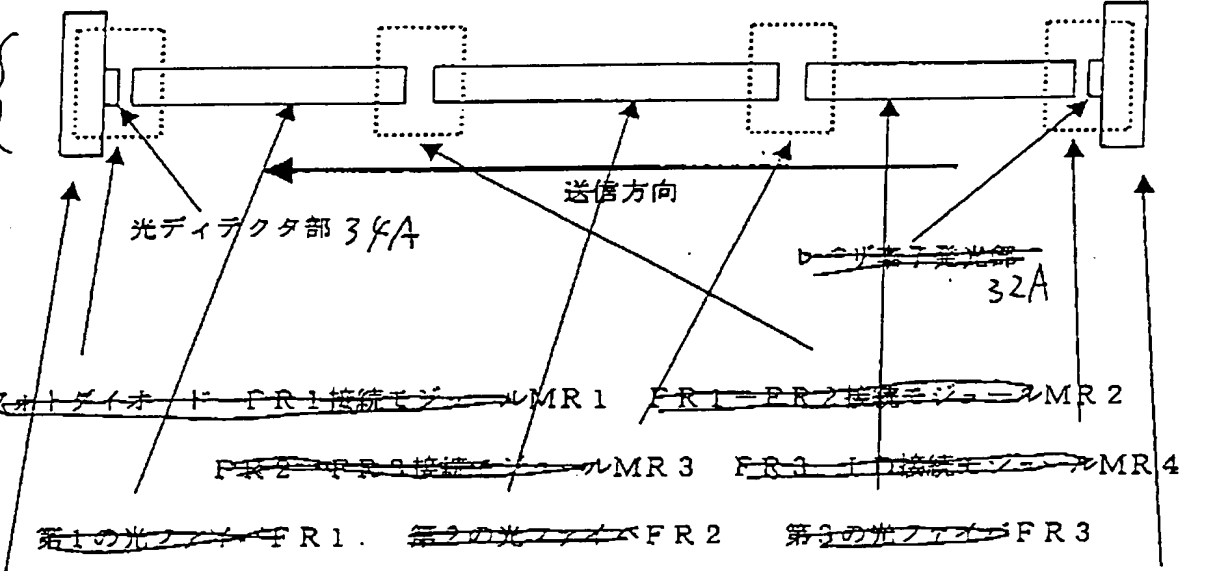
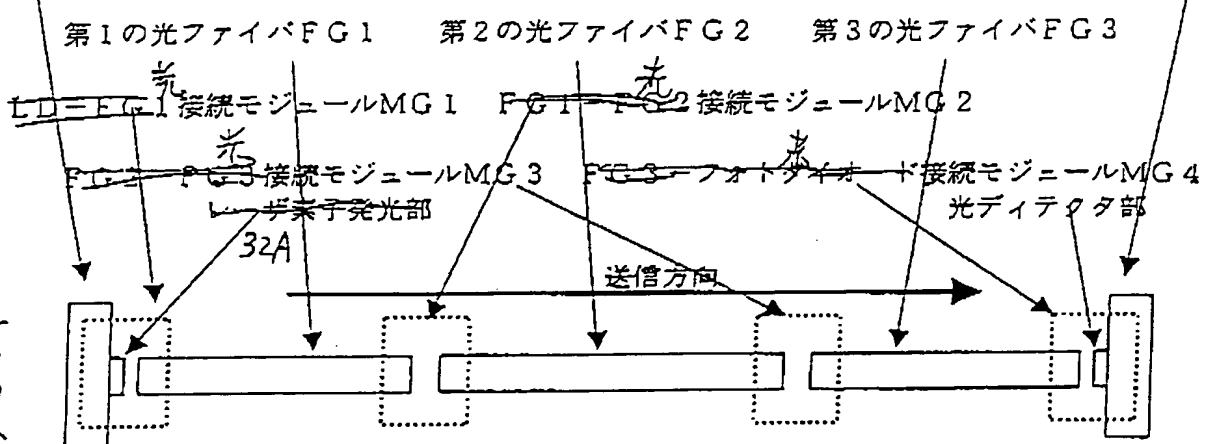


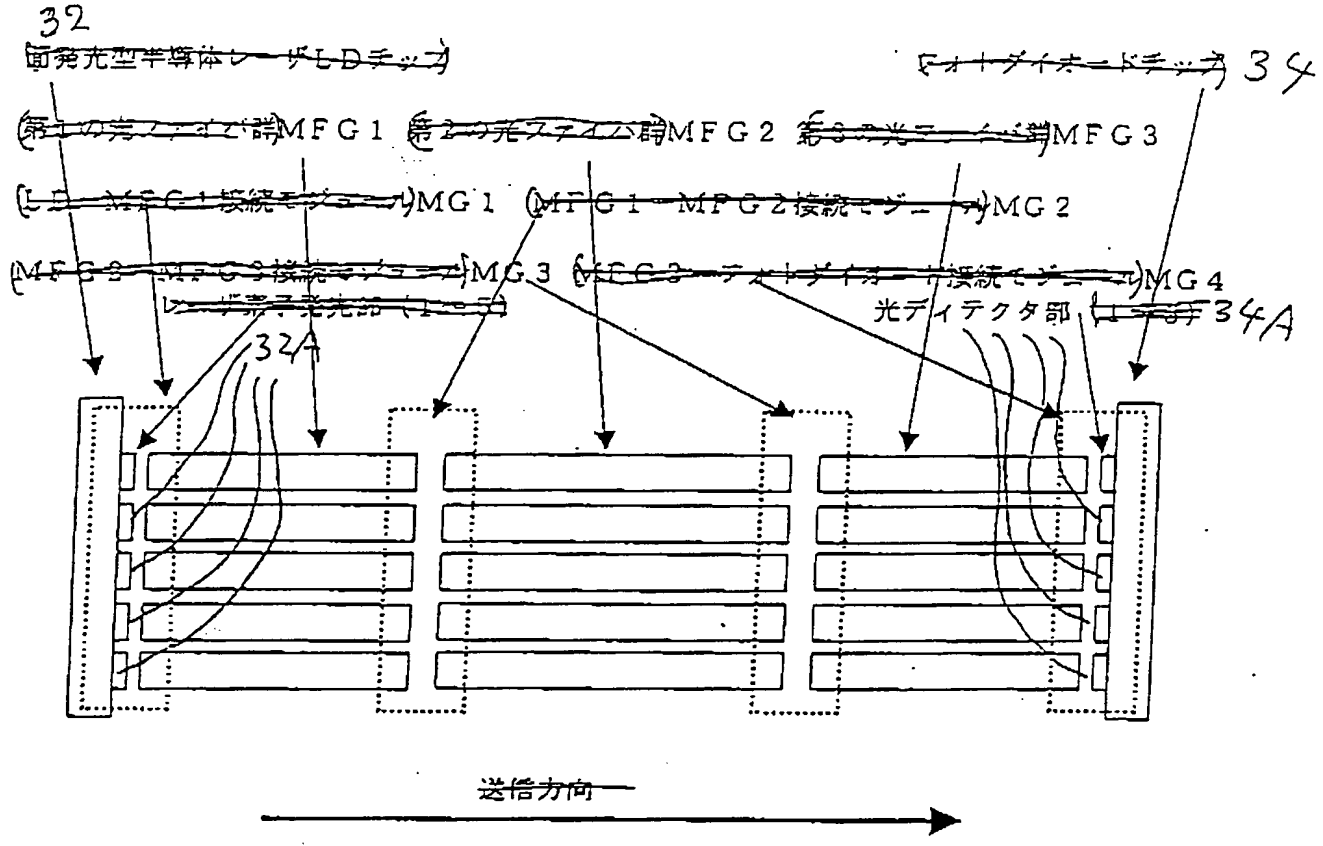
図36

10085204.022602

~~図 36~~

F1G54

カ



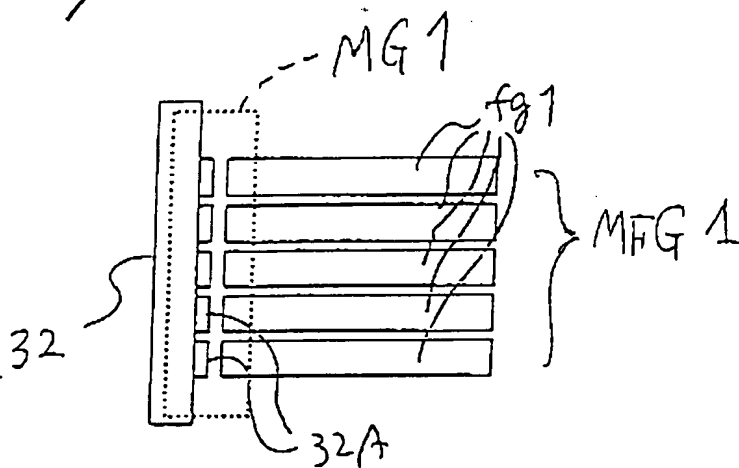
~~図 37~~

10085204.022602

~~55~~
~~3/8~~

HIG 55

98



~~3/8~~
EVC

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~~FIG 56~~

FIG 56

カ8

LDテックホルダー

ファイバホルダー

61

62

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32

32A

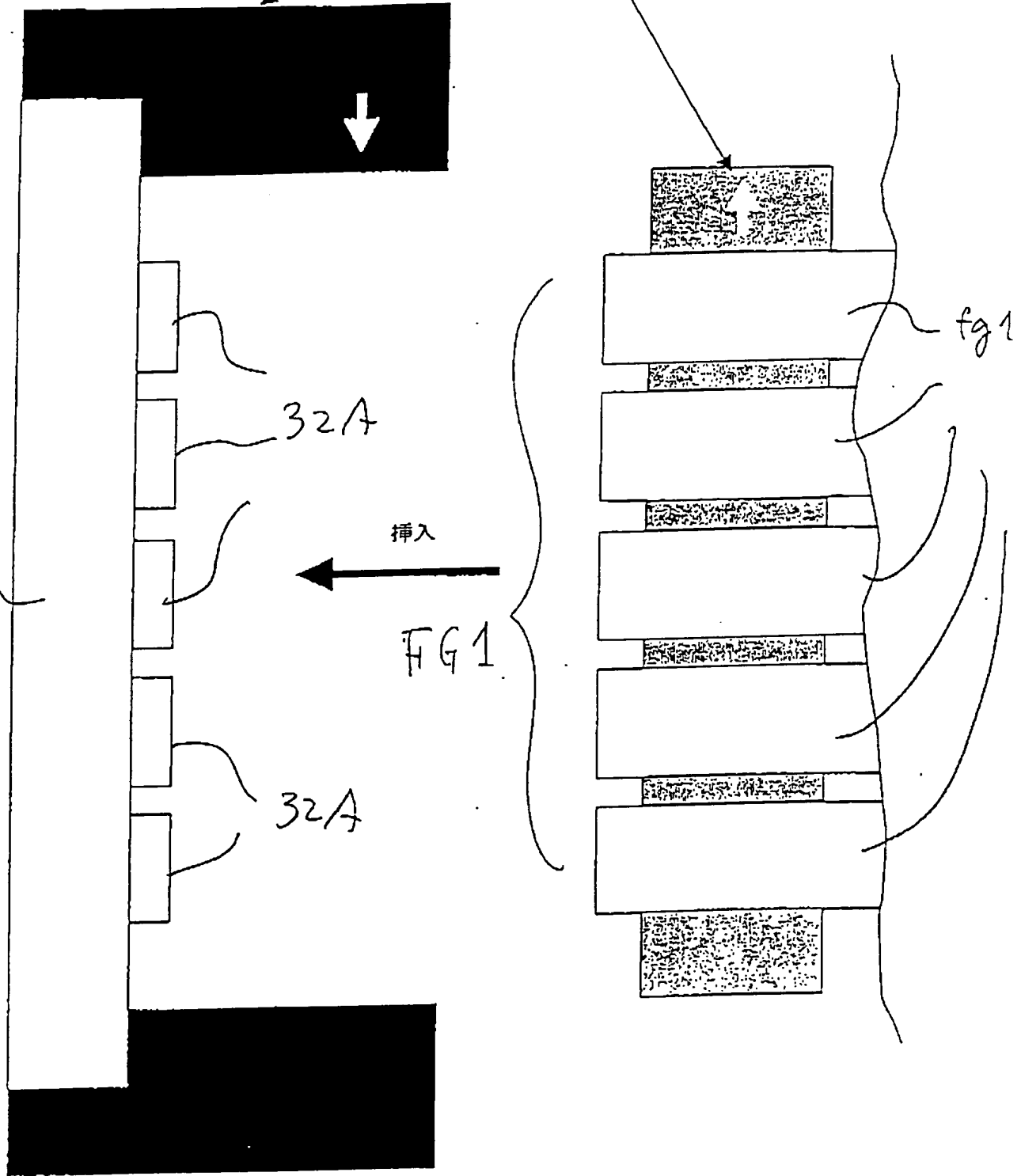
挿入

FG1

32A

fg1

8/9

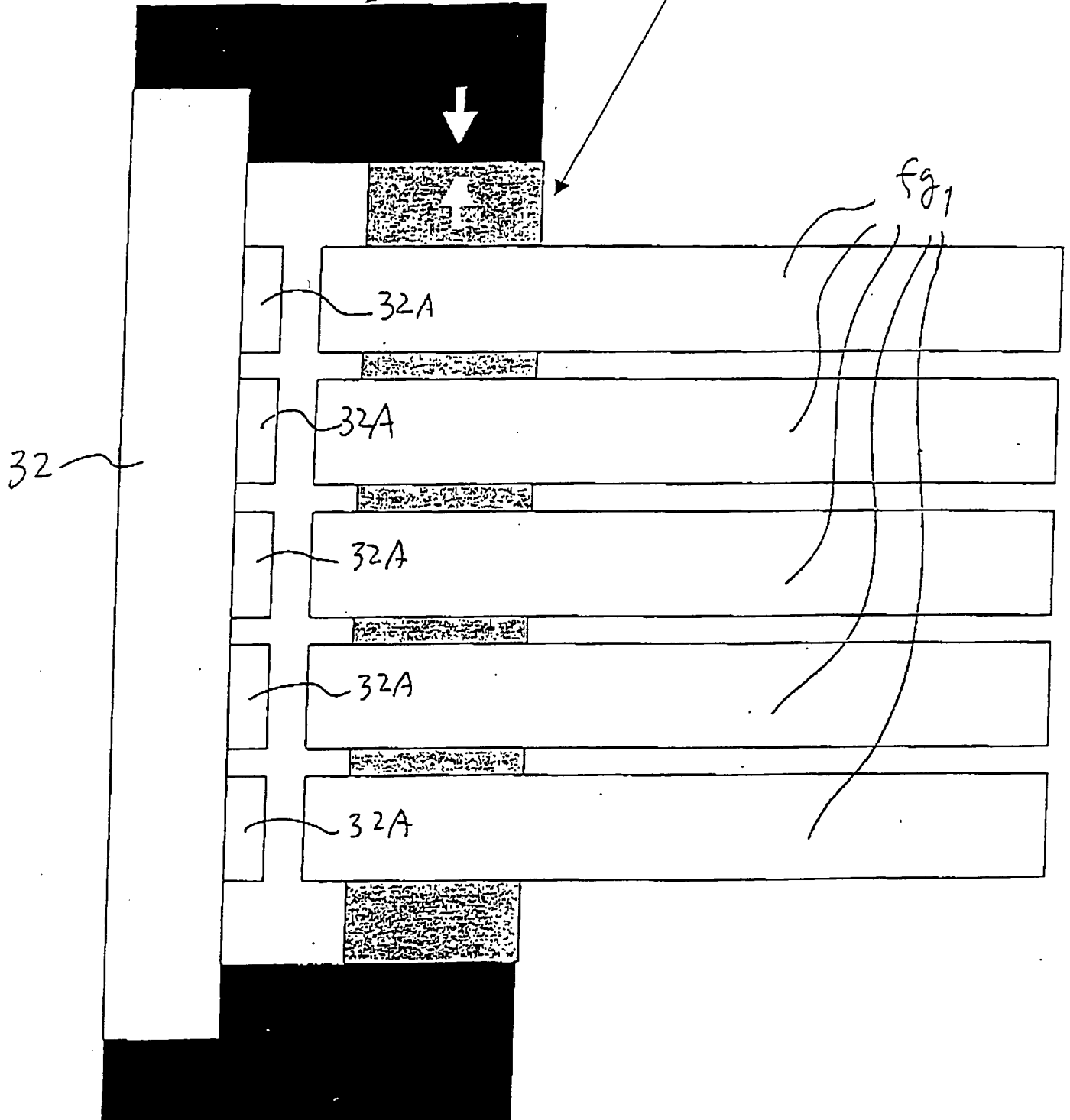


[13] 487 FIG 57

48

LDチップホルダ 61

ファイバホルダ 62



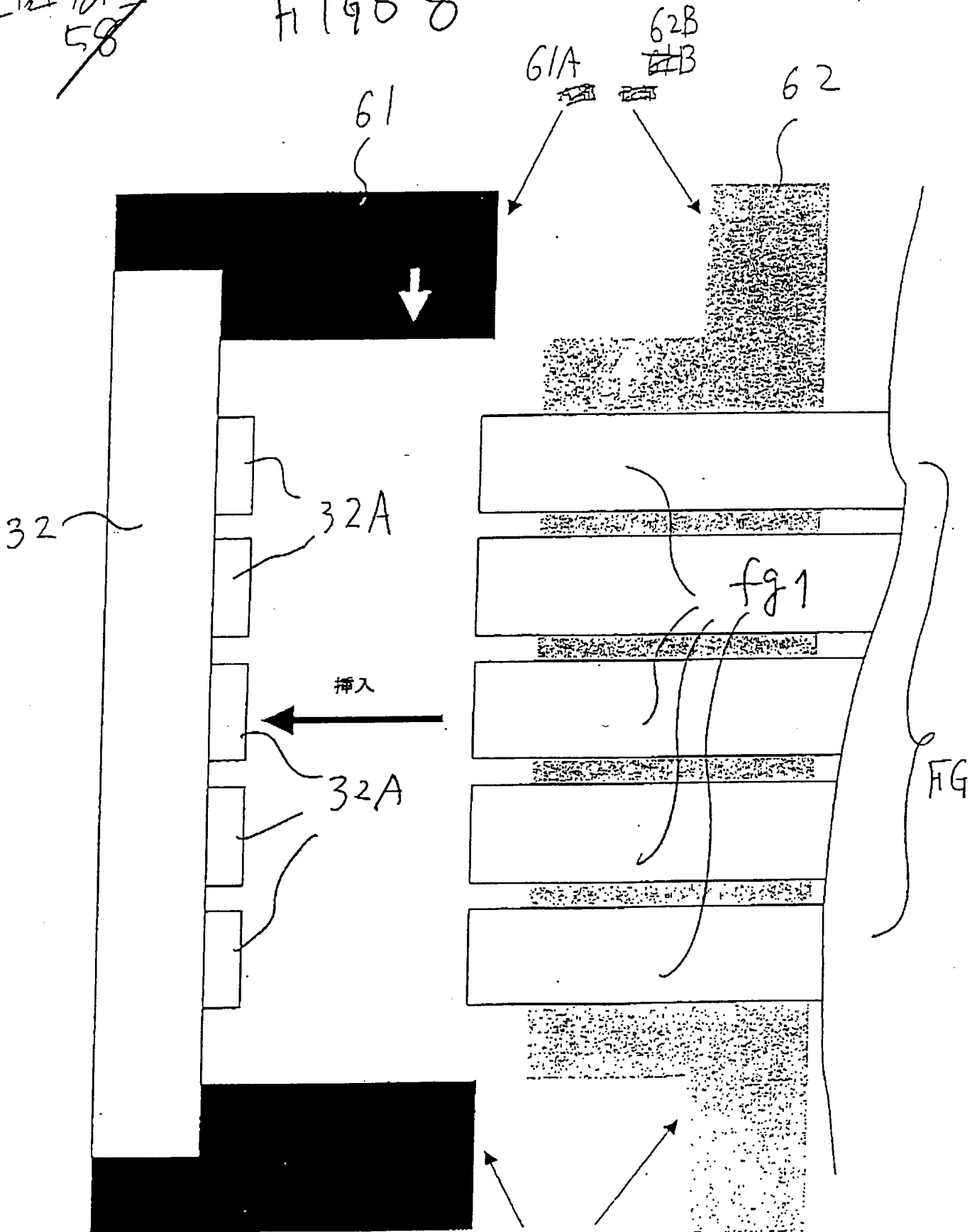
49

10085204.022602

~~FIG 58~~

FIG 58

58



~~FIG 58~~
61A 62B

10085204.022602

A8

C12 12
59

FIG 59

61

62



fg 1

32A

32

MFG 1

2

10085204.022602

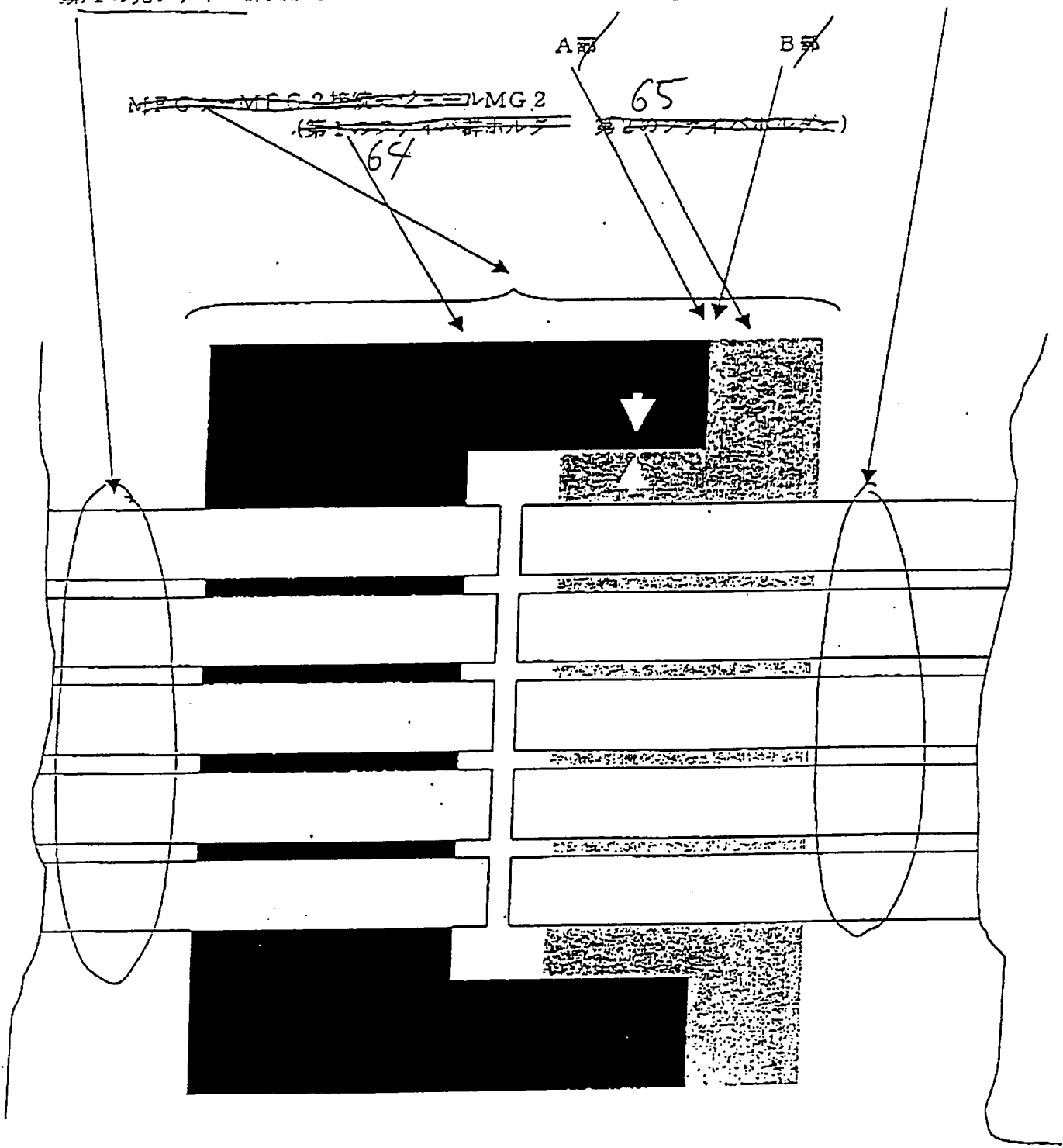
[12/18]
60

H1G60

48

第1の光ファイバ群MFG 1

第2の光ファイバ群MFG 2

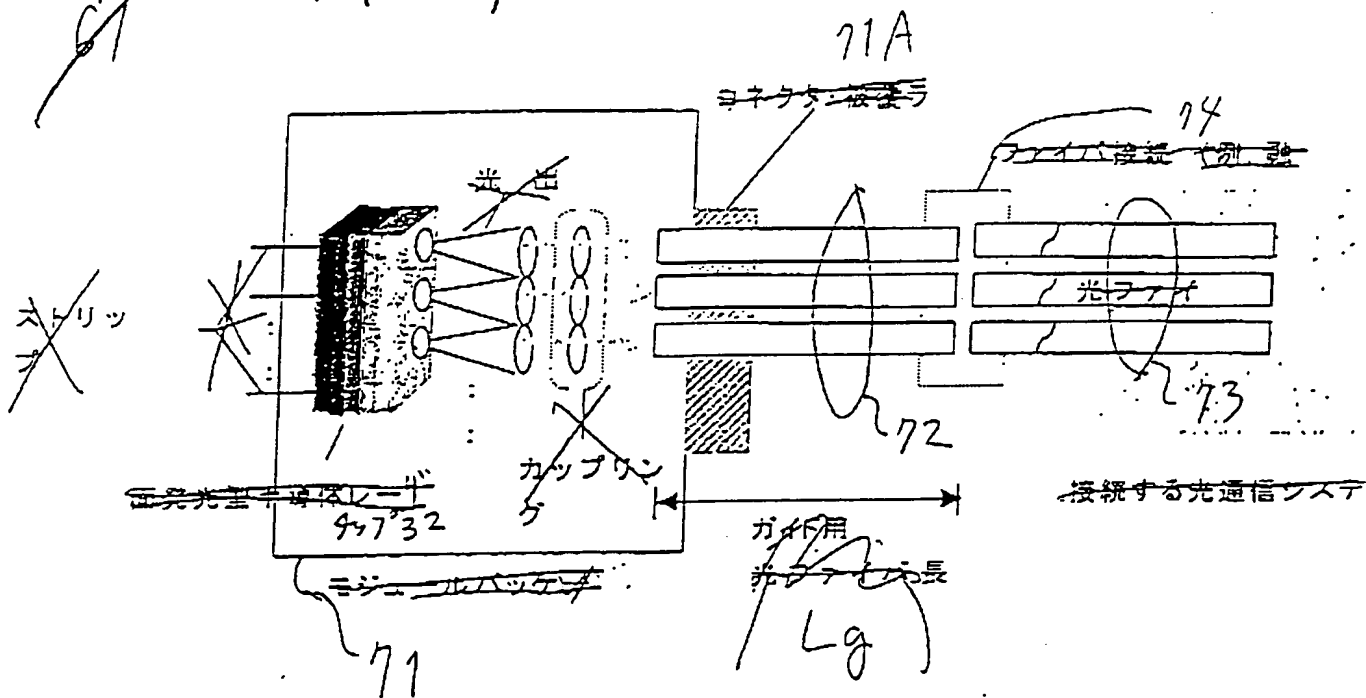


10085204.022602

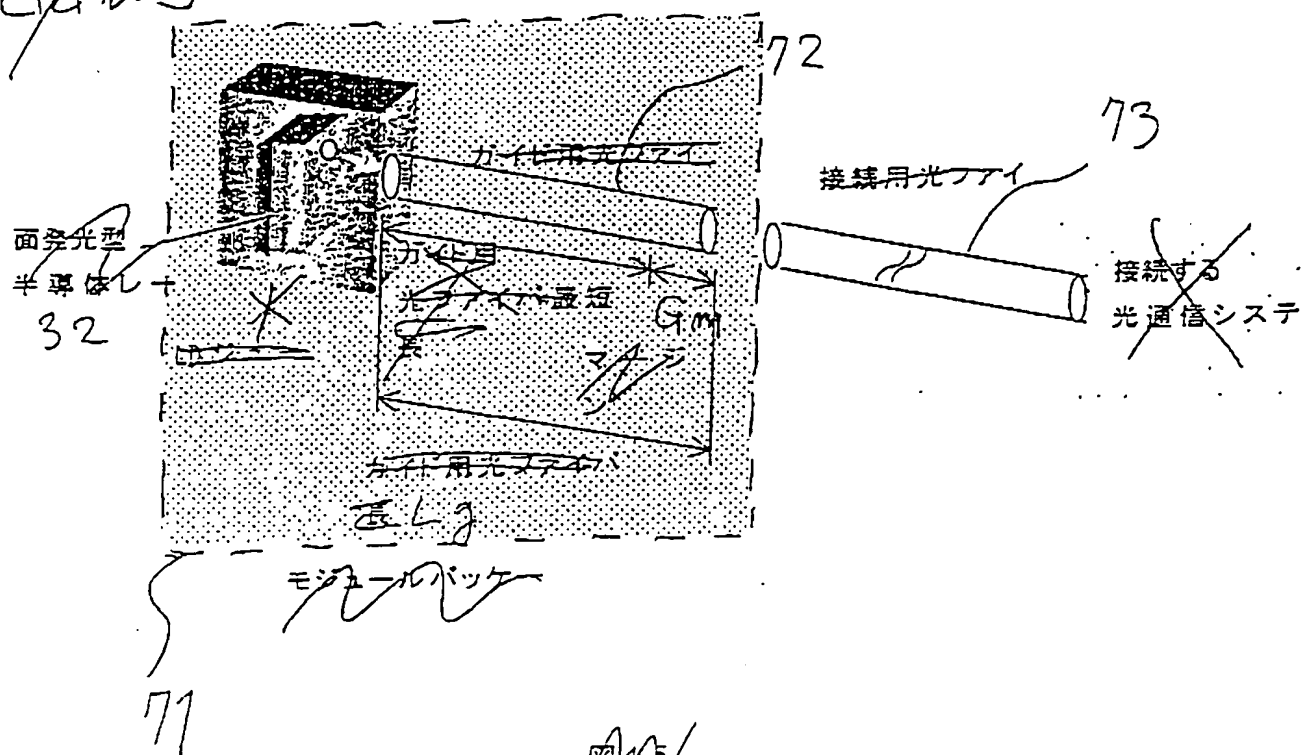
~~図 44~~
61

F/G61

49



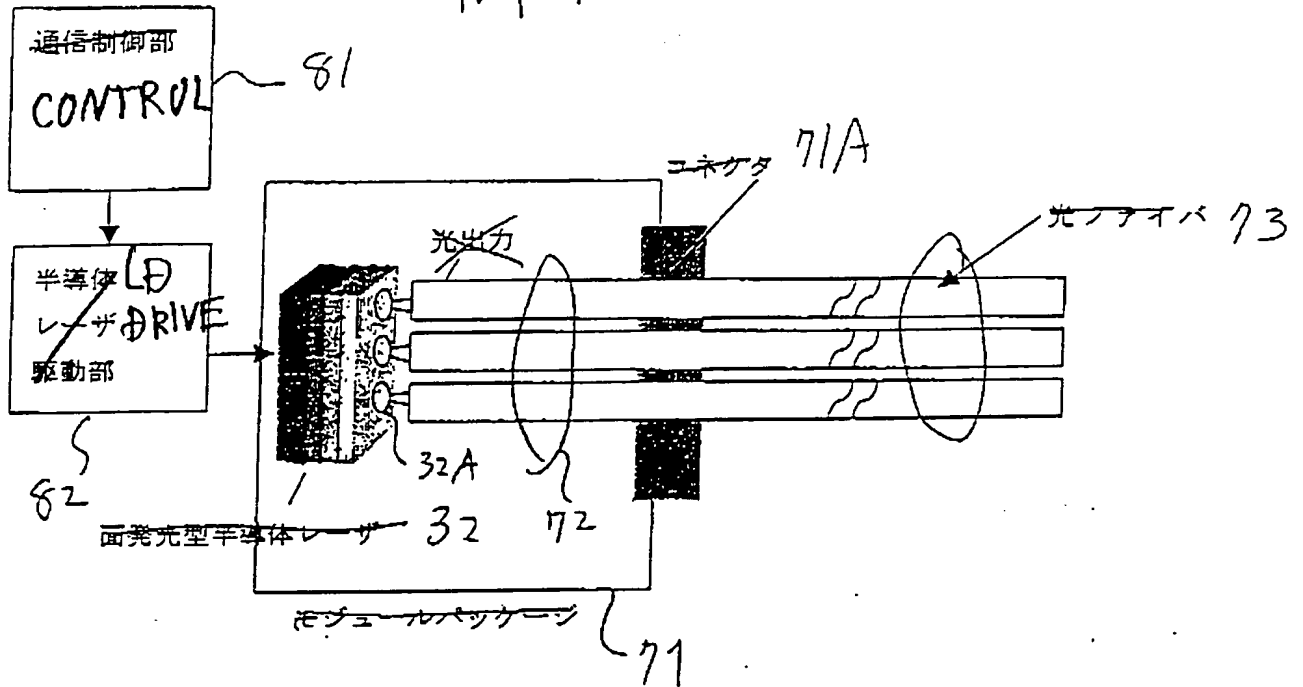
~~図 45~~
62
F/G62



710

~~[12] 63~~

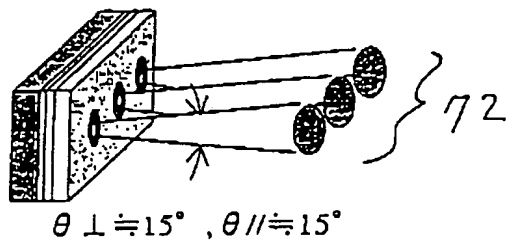
H1G63



~~図 46~~

~~[12] 64~~

H1G64



~~図 47~~

10085204.022602

~~[FIG 65]~~
 65

FIG 65A
 (A)

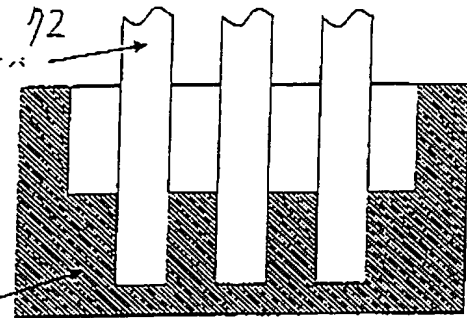


FIG 65C

FIG 10

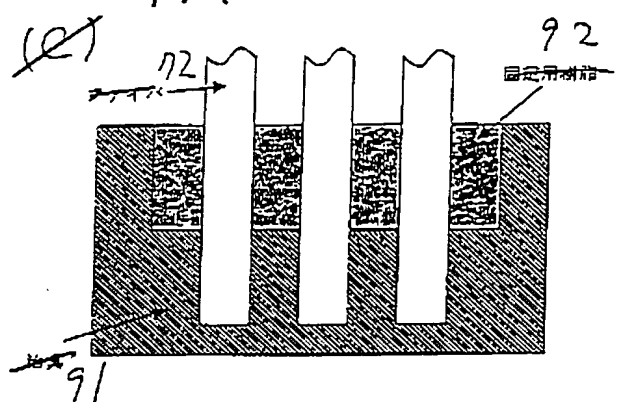
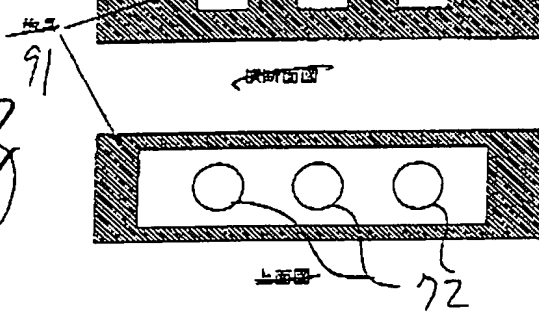


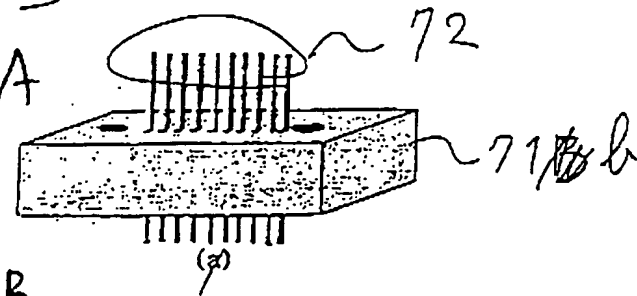
FIG 65B
 (B)



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~~[FIG 66]~~
 66

FIG 66A
 (A)



} 71A

FIG 66B
 (B)

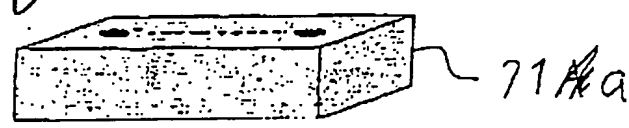
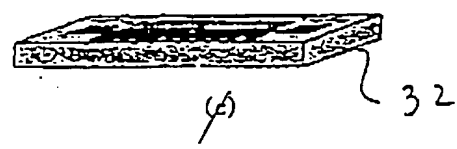


FIG 66C
 (C)



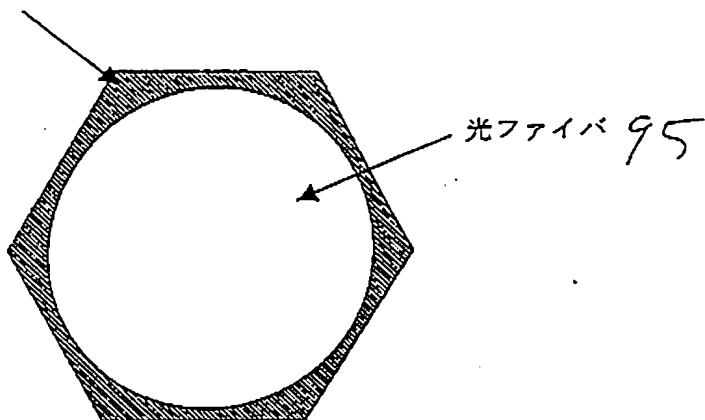
~~[FIG 69]~~
 69

710

~~61~~
~~[2] 50~~

H/G67

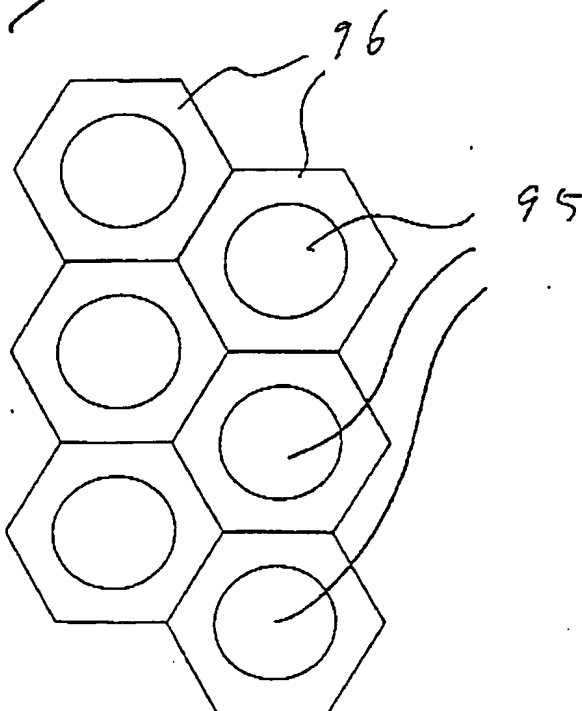
樹脂 ~~埋まる領域~~ 96



~~68~~
~~[2] 50~~

~~図 50~~

H/G68



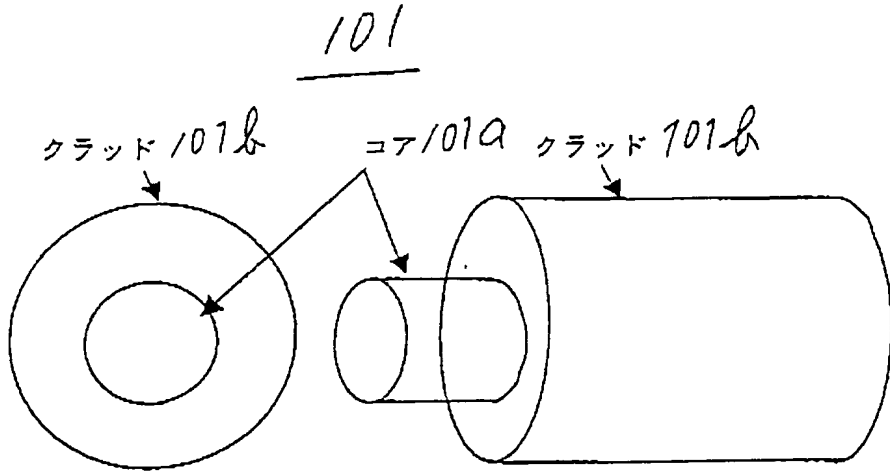
~~図 51~~

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69
[12/82]

FIG 69



70
[12/83]

FIG 70

図 5/2

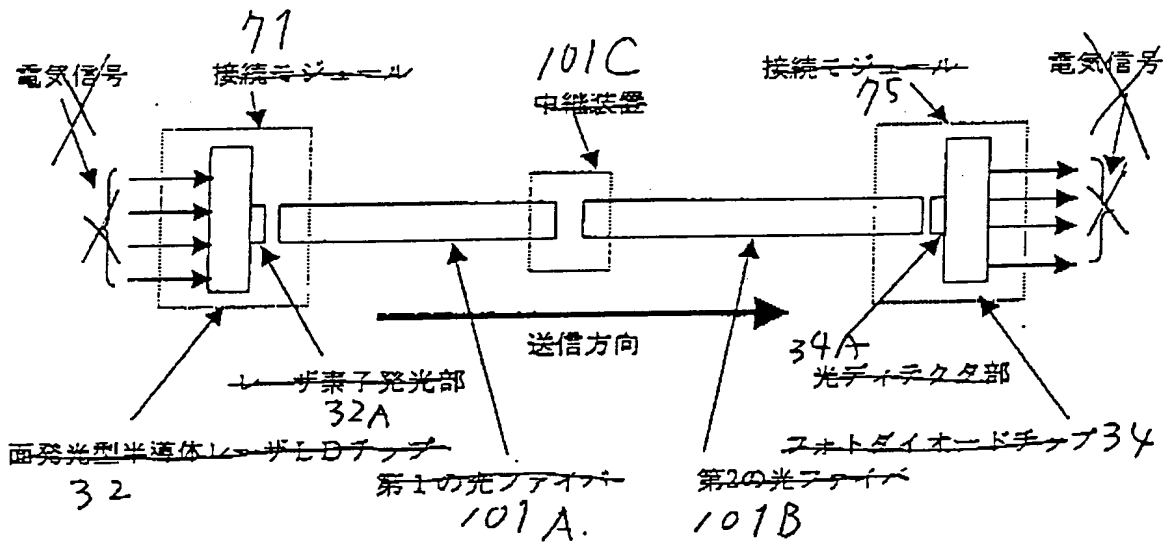


図 5/3

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FIG 71

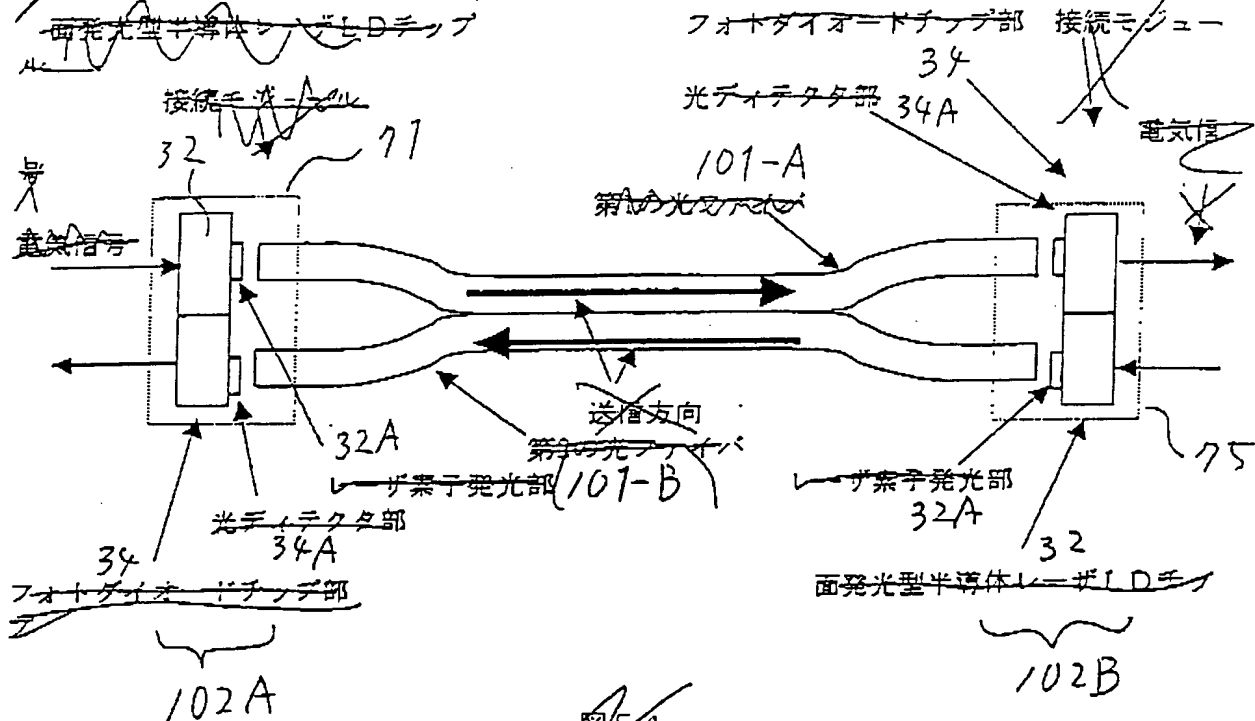


図54

FIG 72

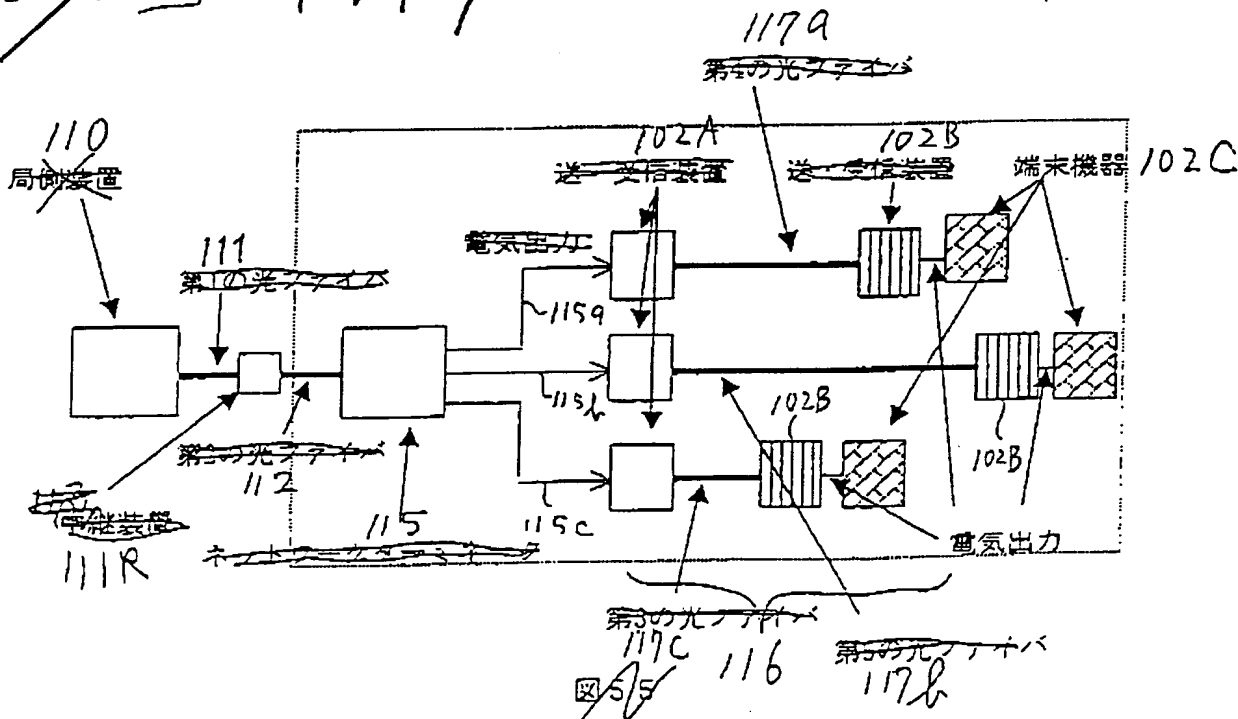
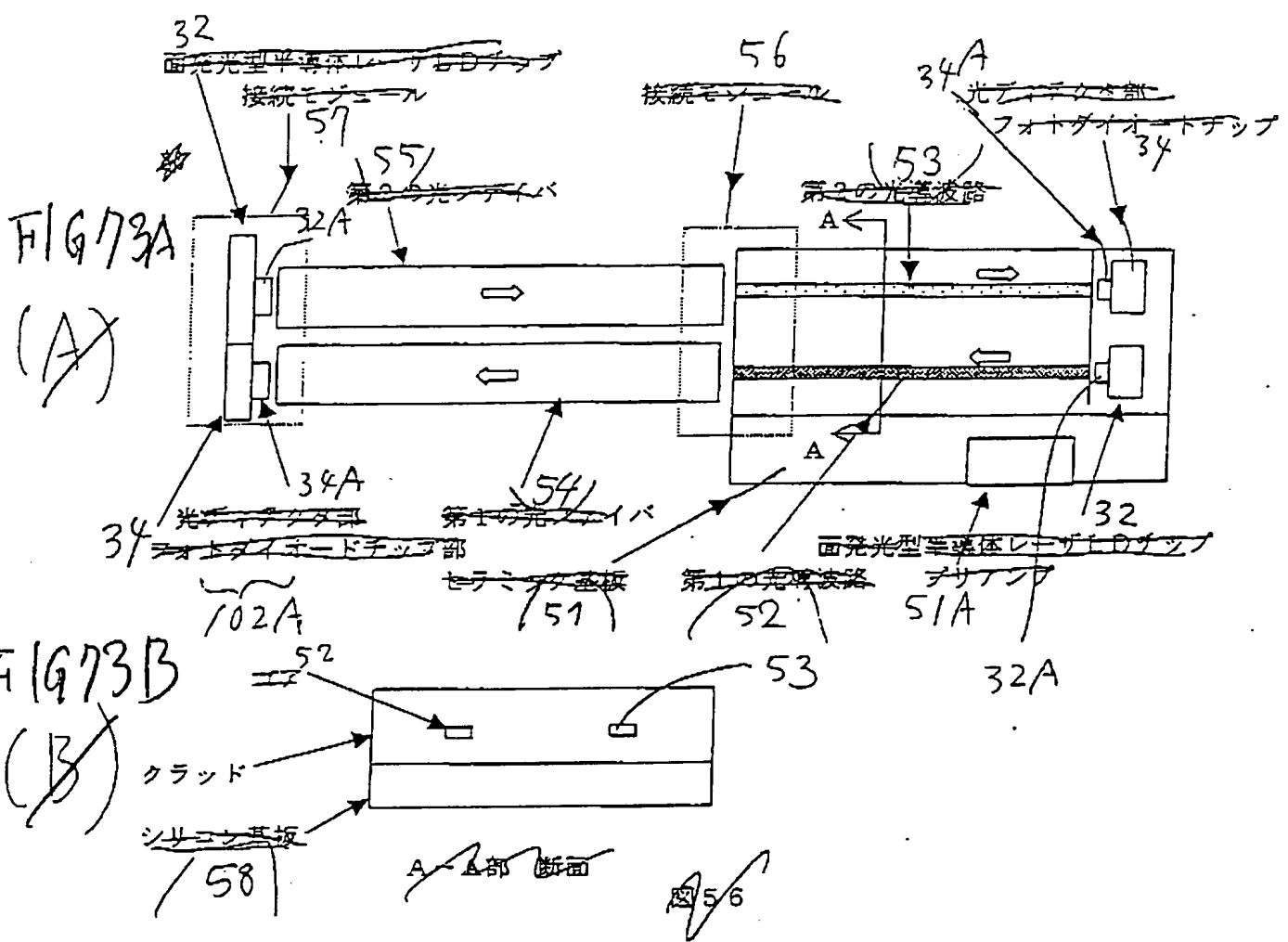


図55

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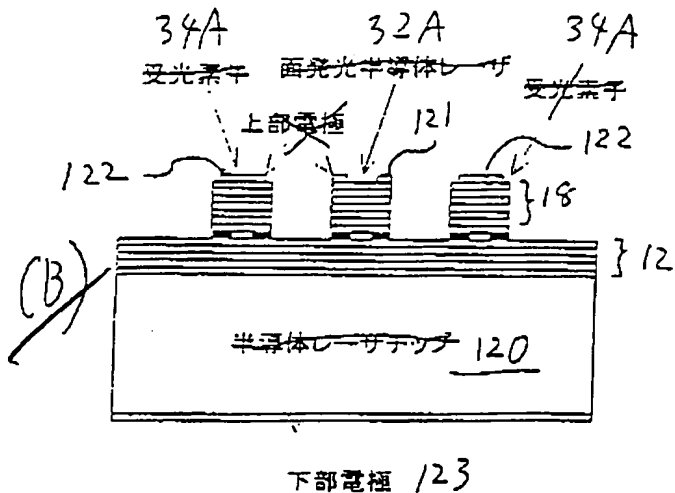
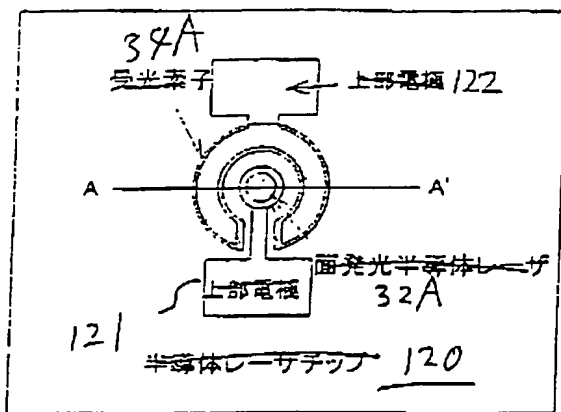
[12] 58



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~~FIG 74A~~ ~~FIG 74A~~

FIG 74B 12

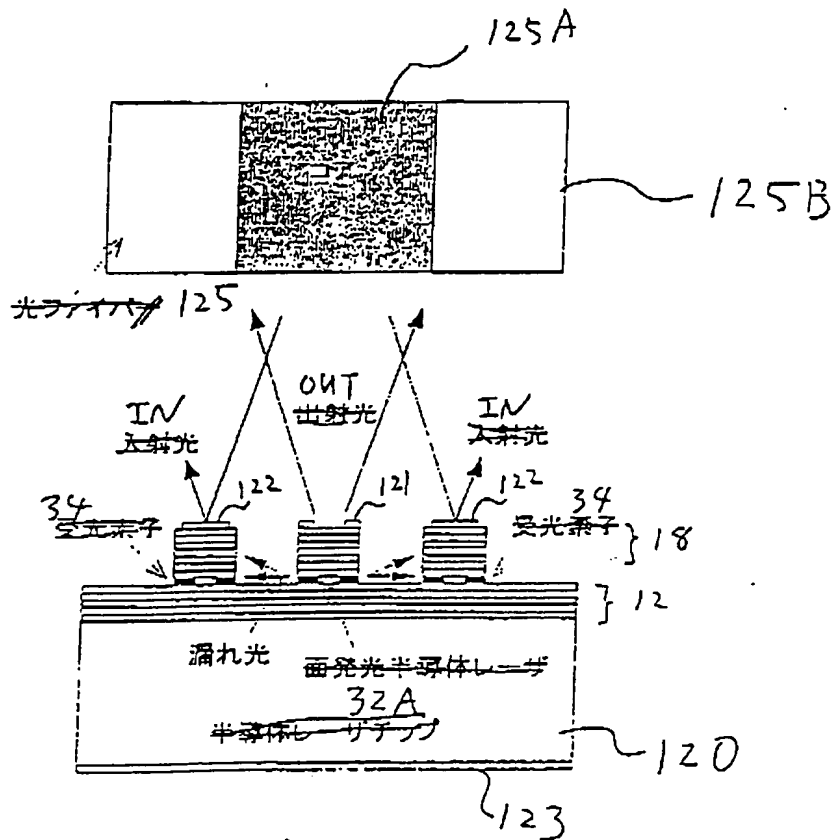


(A)

(B)

~~FIG 75~~ ~~FIG 75~~

~~FIG 75~~ ~~FIG 75~~

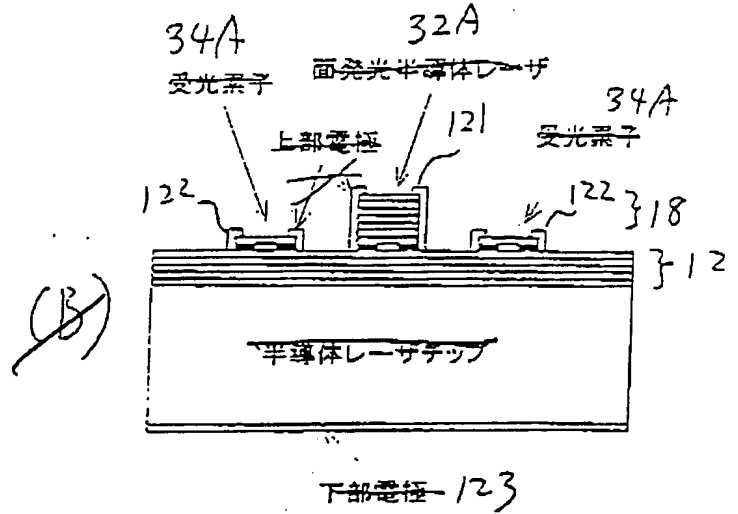
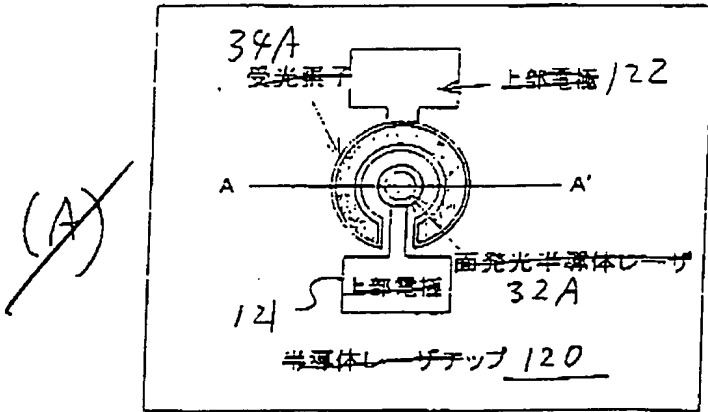


~~FIG 75~~ ~~FIG 75~~

~~FIG 76A~~
FIG 76A

FIG 76B

FIG 12



(a)

FIG 59

(b)

~~FIG 77~~
FIG 77

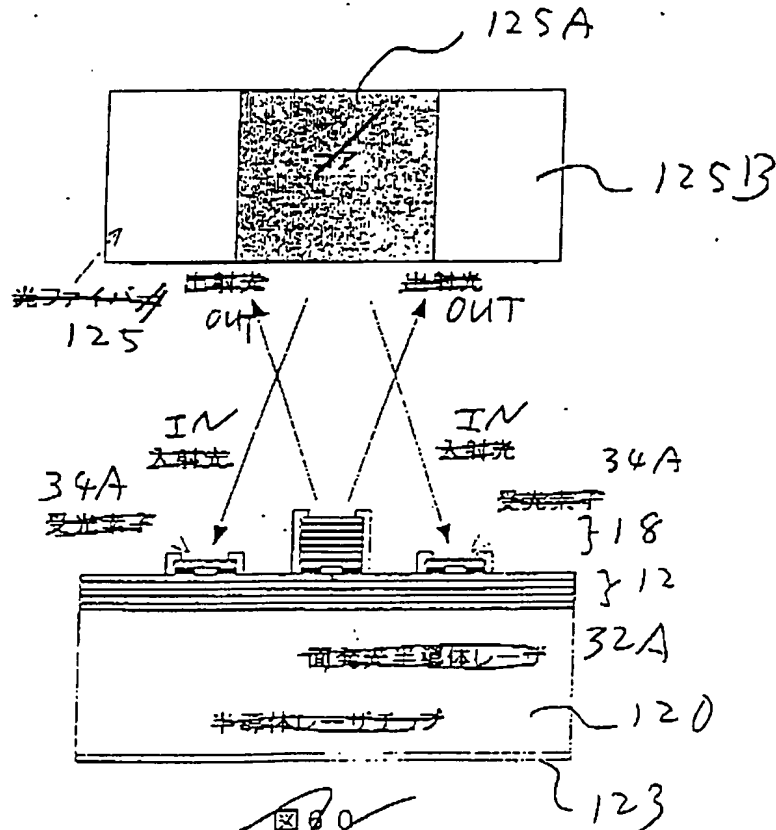


FIG 80

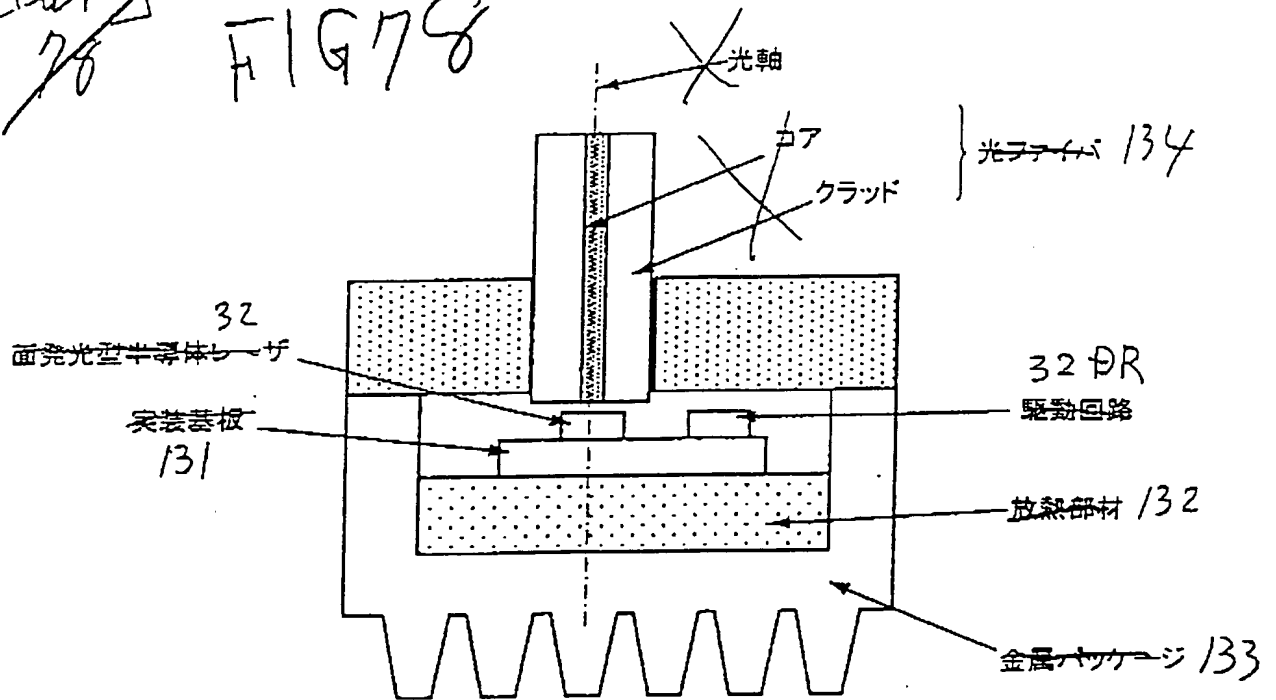
401

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13

[18] 69
 78

FIG 78



[17] 68
 79

FIG 79

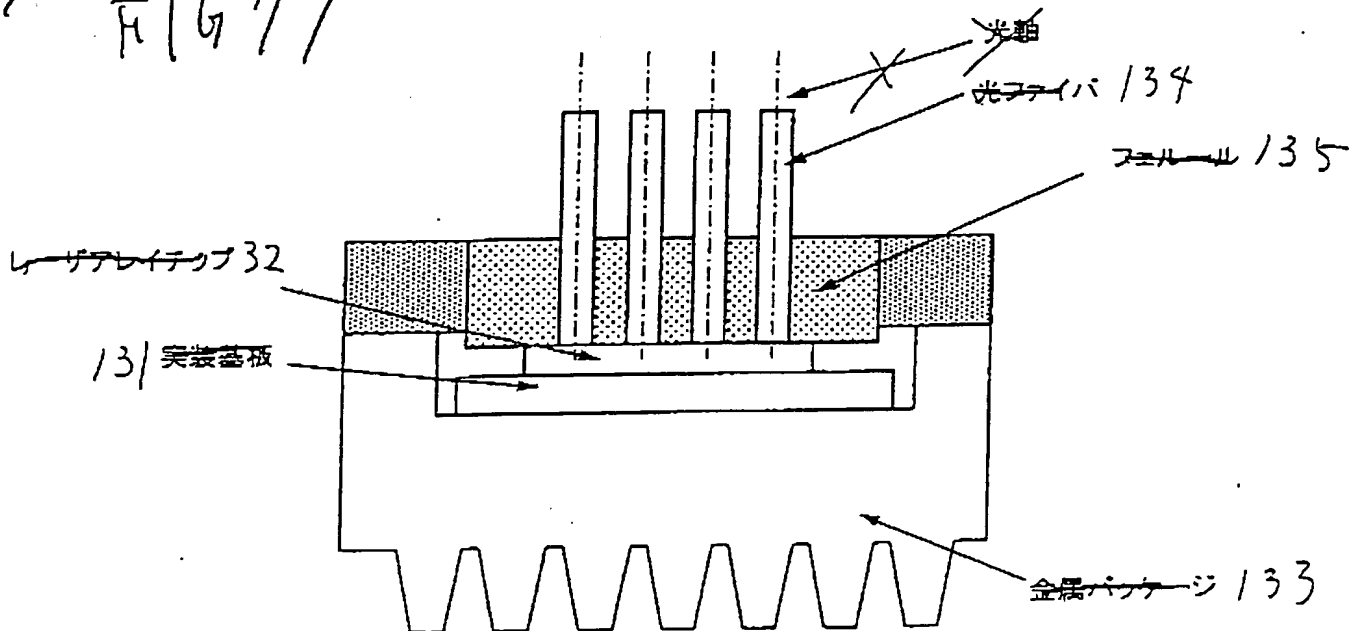
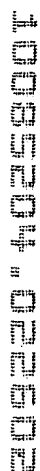


図 82

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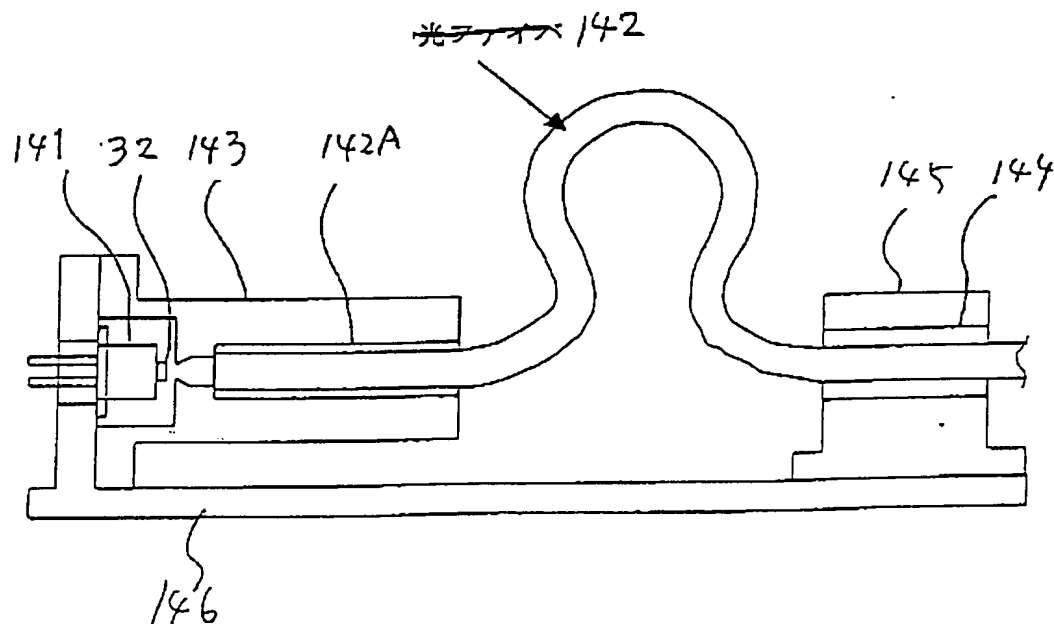
7/15

~~[7] 63 [8]
80~~



~~81~~

F/G 8/

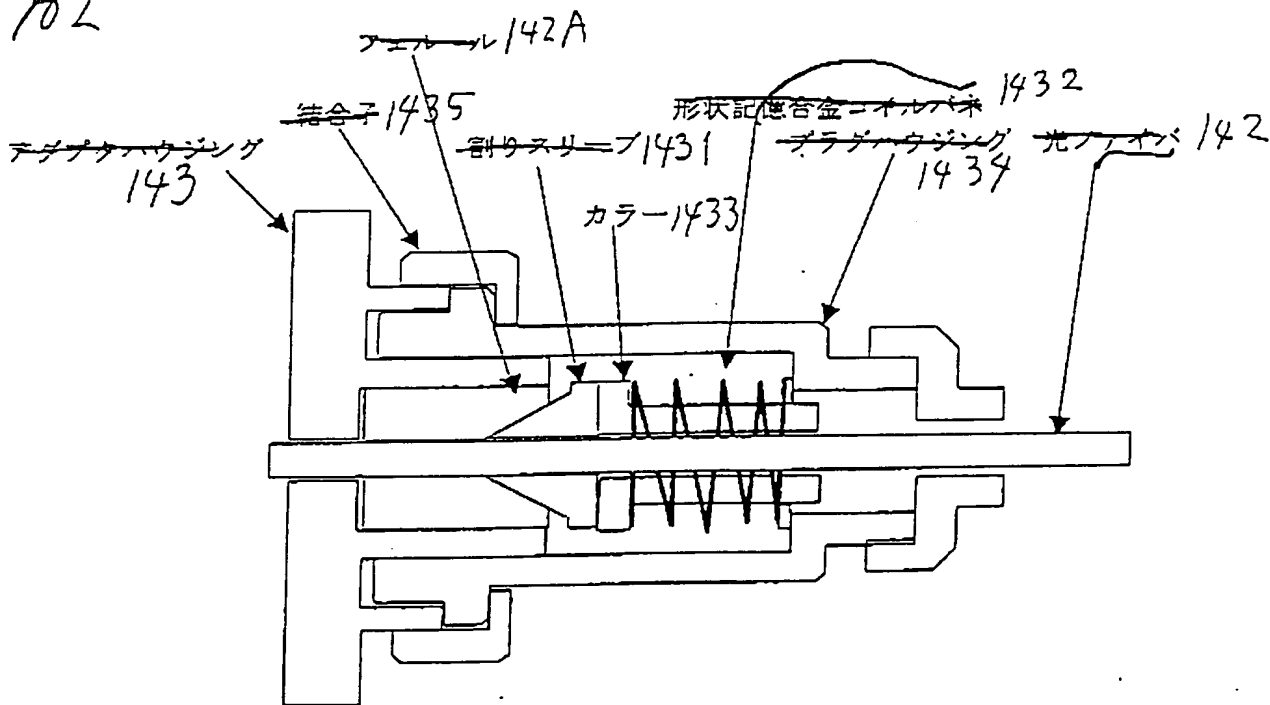


64

7117

[~~FIG 82~~]
82

FIG 82



[~~FIG 83~~]
83

FIG 83

FIG 83

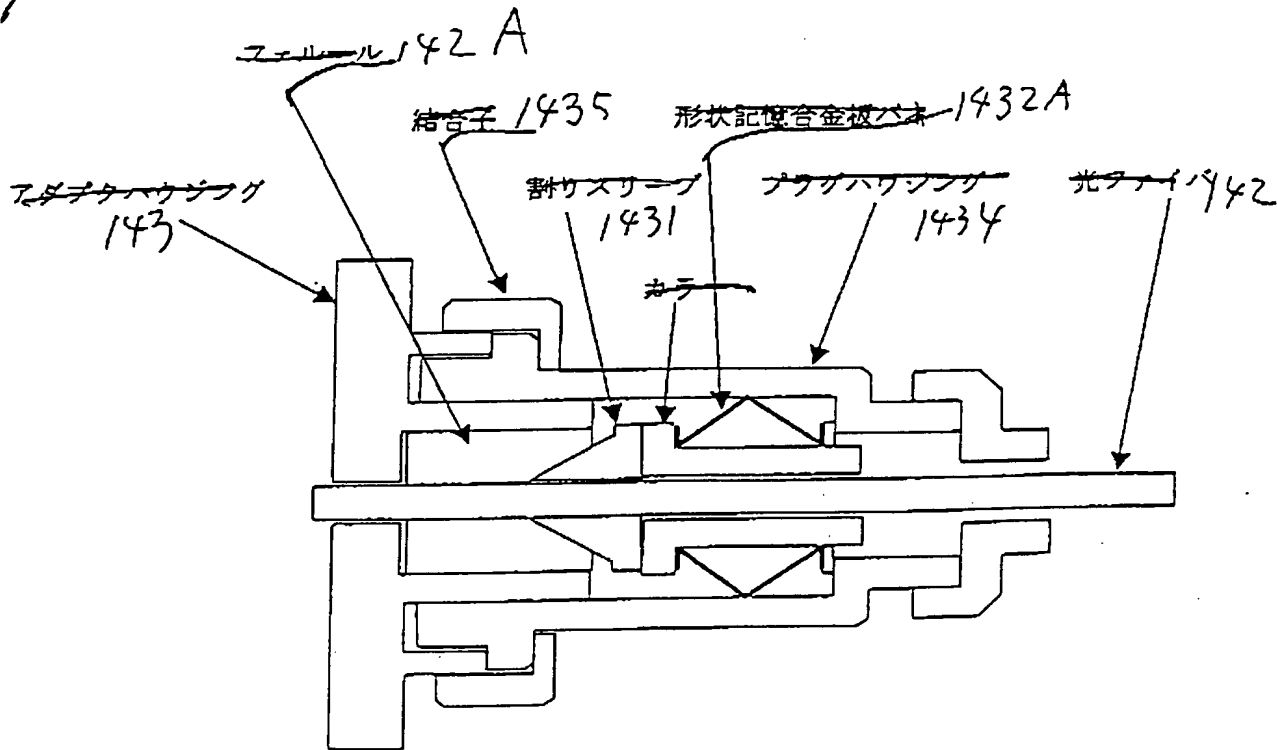


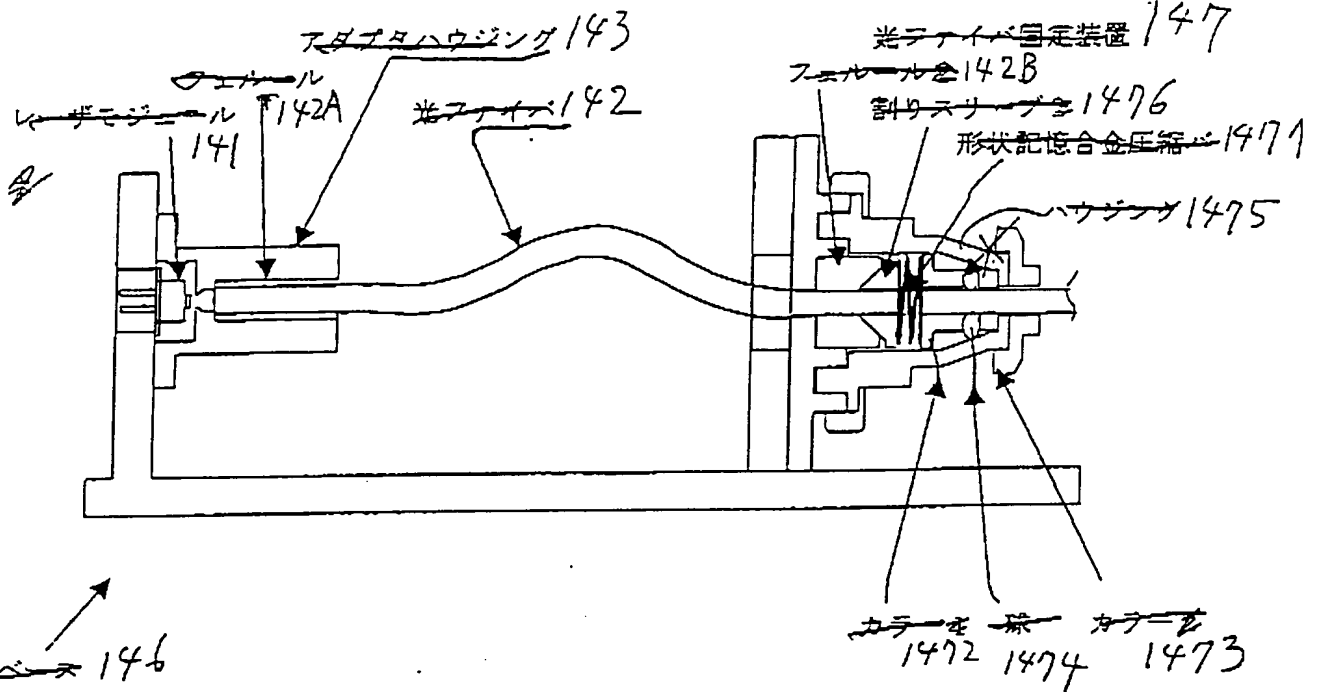
FIG 83

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84
[18] 84

FIG 84

114



85
[18] 85

FIG 85

図 61

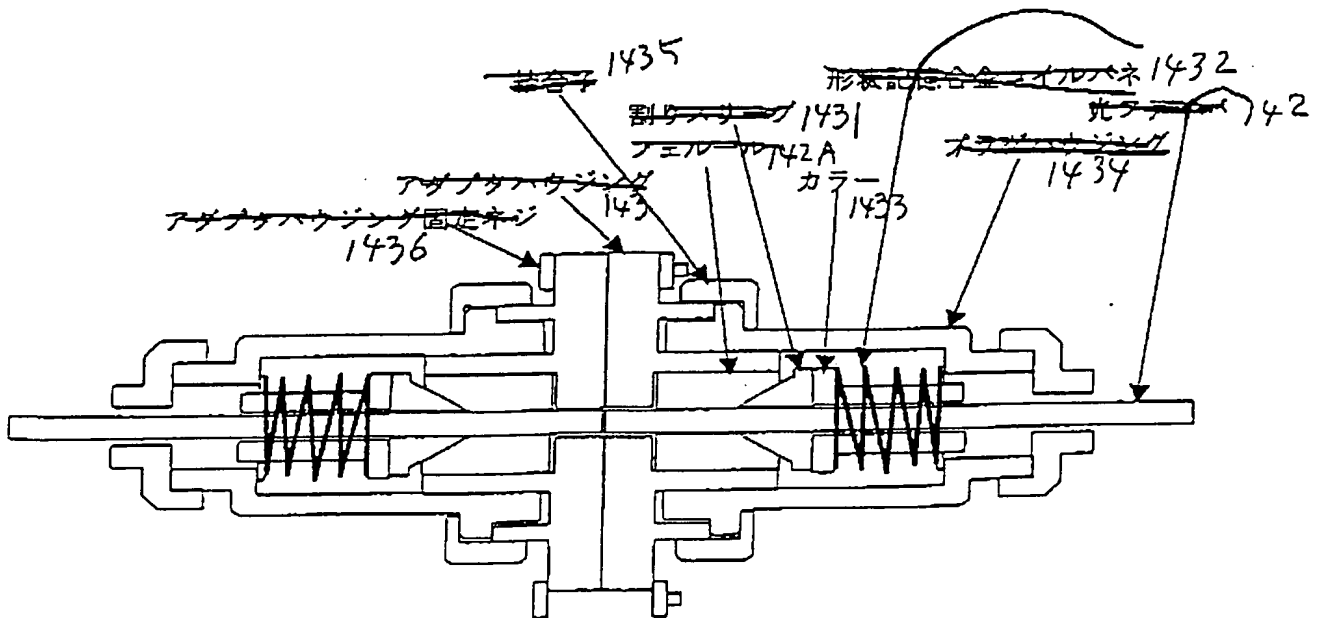


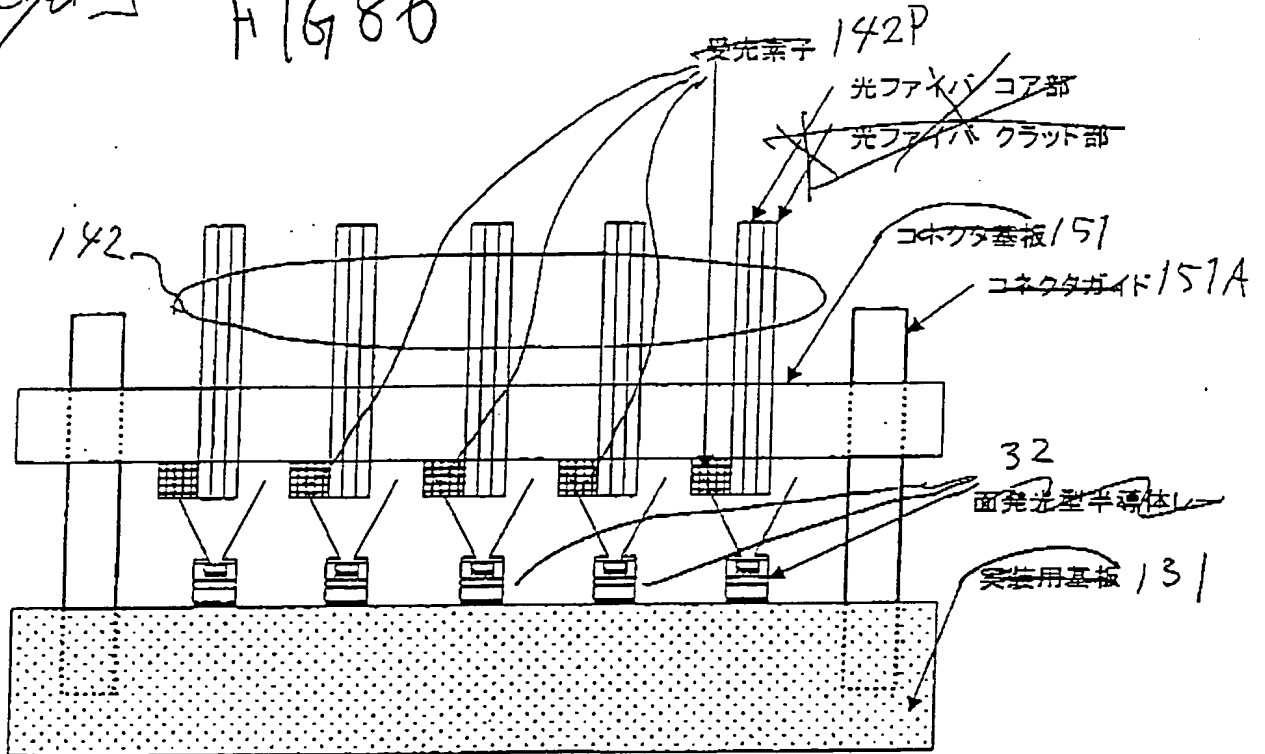
図 63

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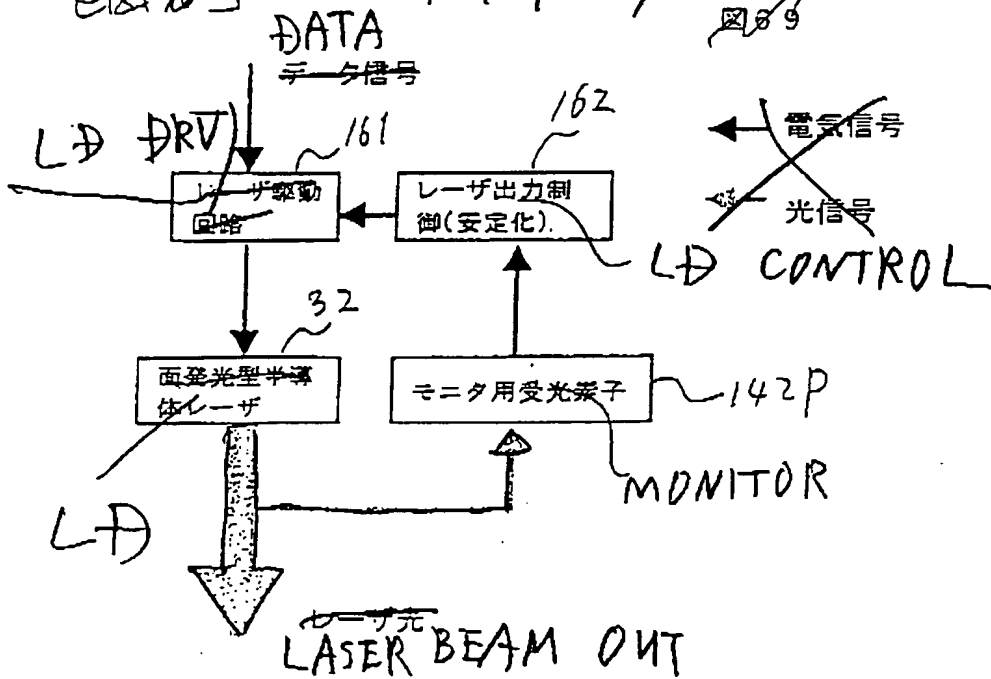
86
[図86]

F/G 86



87
[図87]

F/G 87



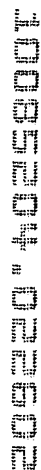
光出力部のブロックダイアグラム

図87

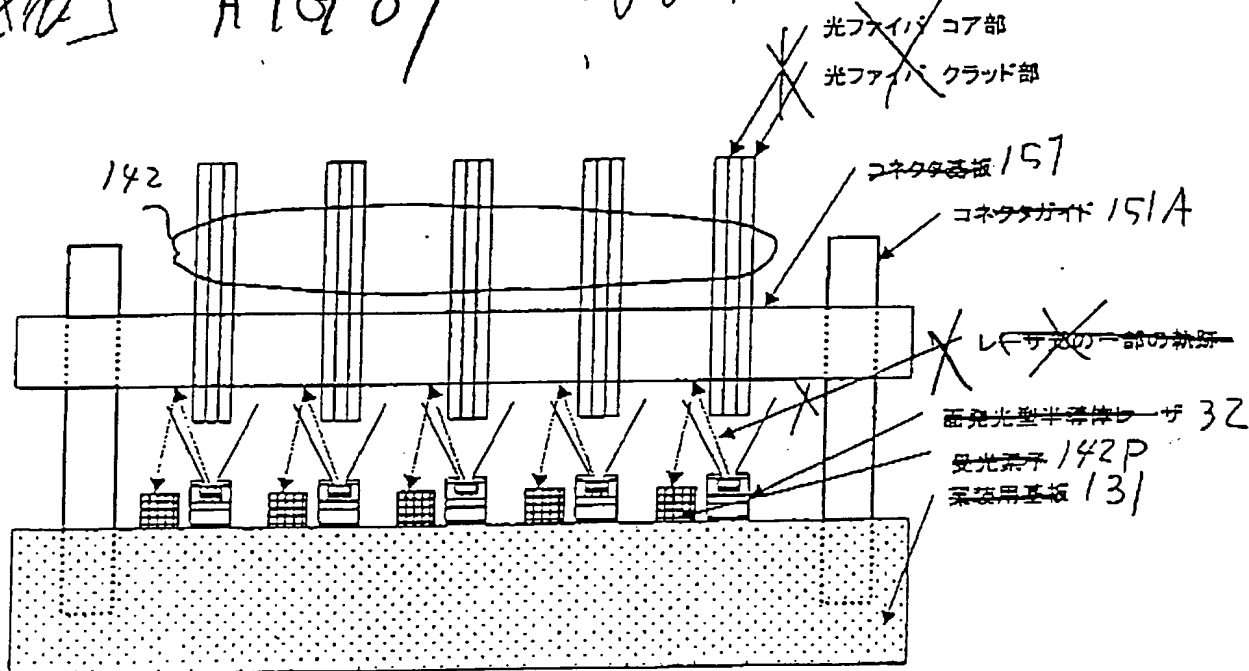
10085204.022602

□~~2~~21□
88

FI 988

~~89~~
~~[2] [2]~~

H/G 89



72

[13] 98
 90

F/G90

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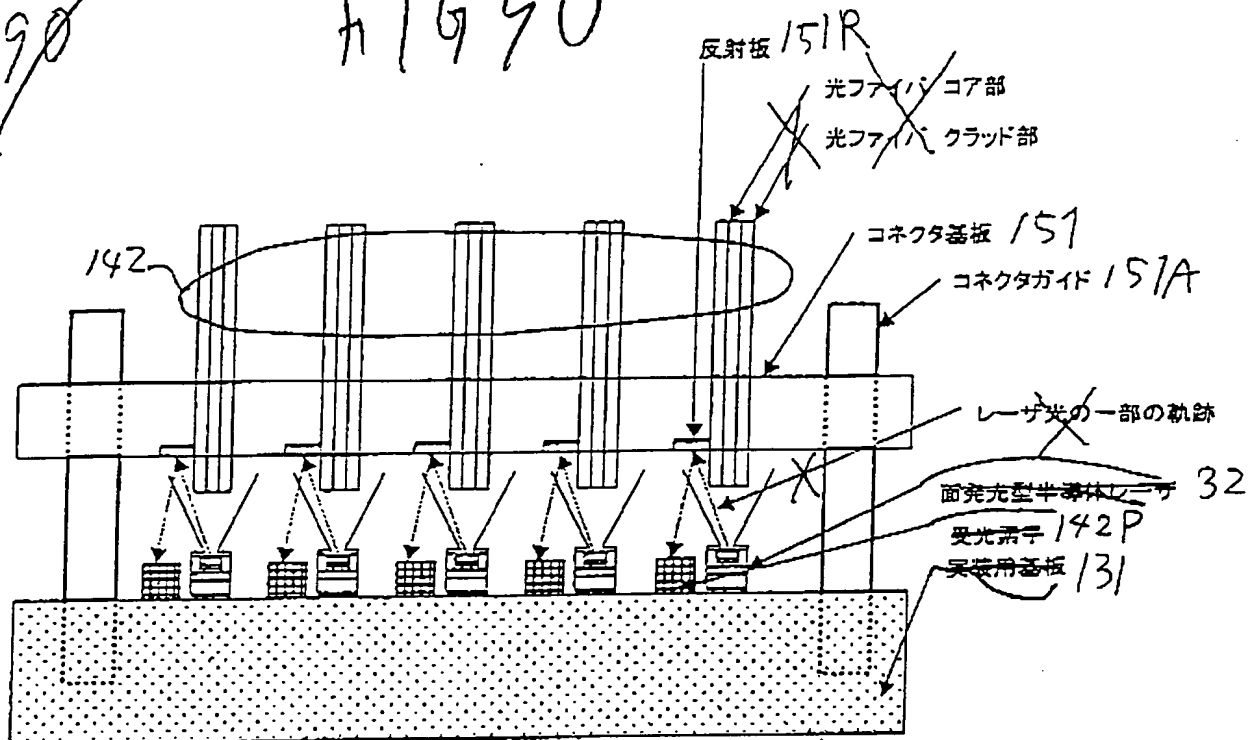
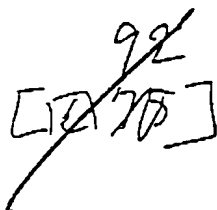


図 73

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H/G 9/

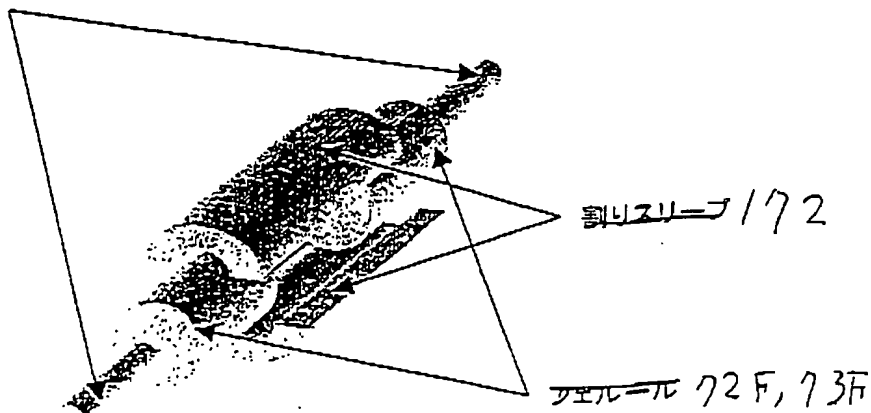
416



F1992

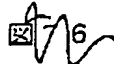
7/4

~~光ヲイハ~~ 72, 73



75

为17



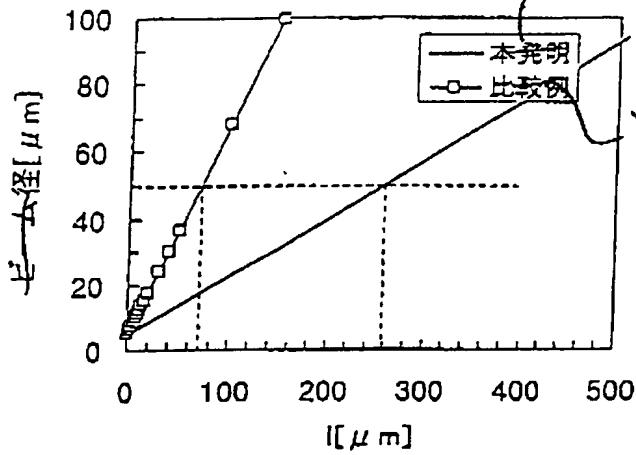
~~99~~
~~[270]~~ F|994



[~~FIG 95~~]
95

FIG 95

Beam Diameter



Present Invention

Reference

[~~FIG 96~~]
96

FIG 96

図 78

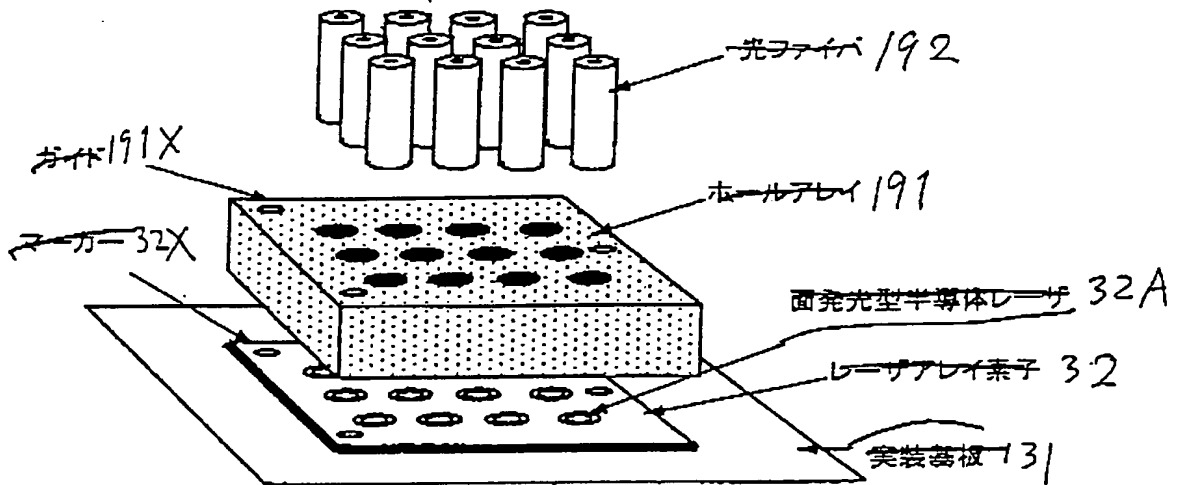


図 78

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~~[80]~~
 97

19

FIG 97A

(A)

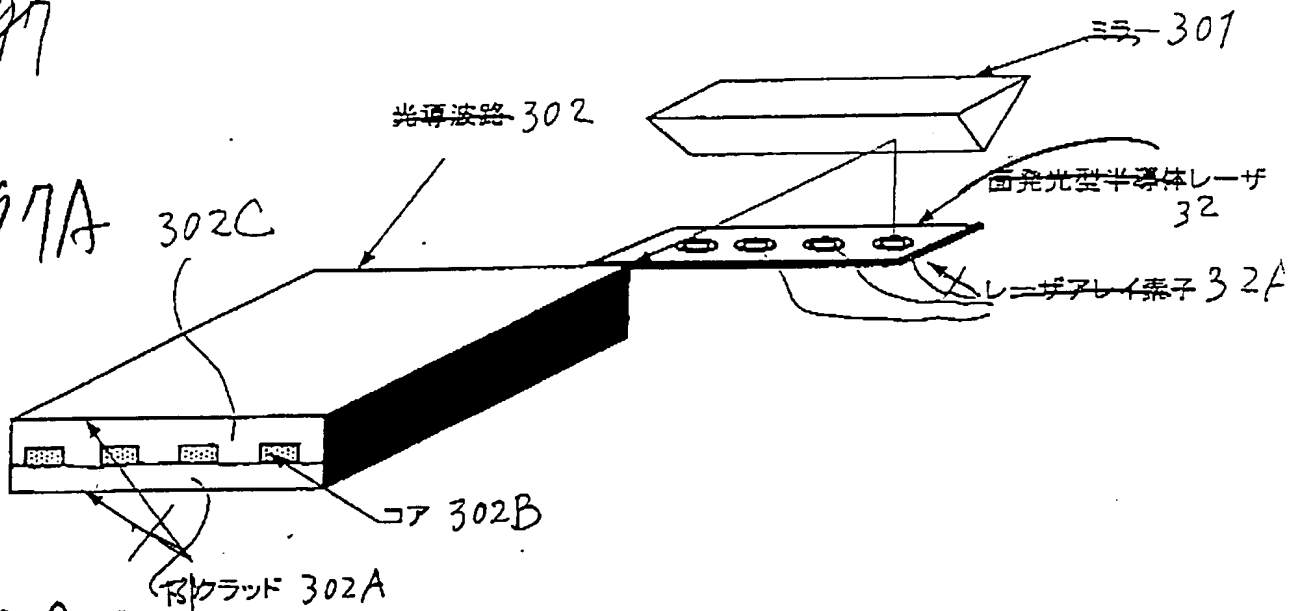
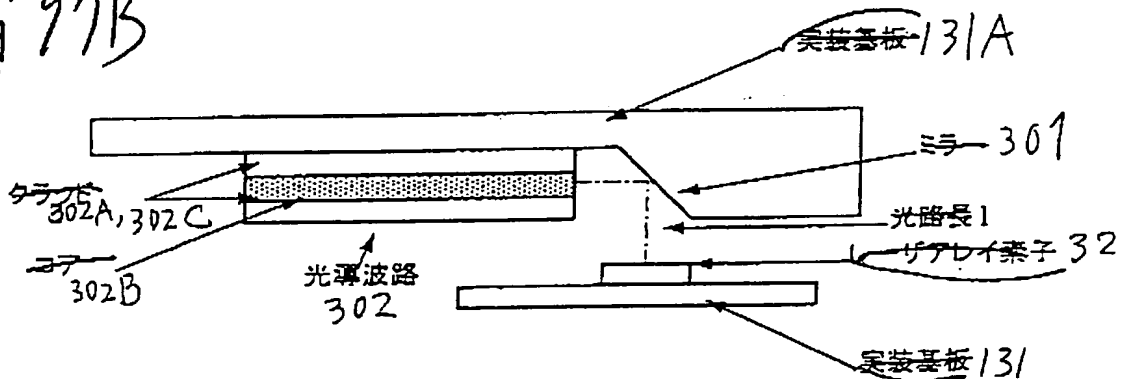


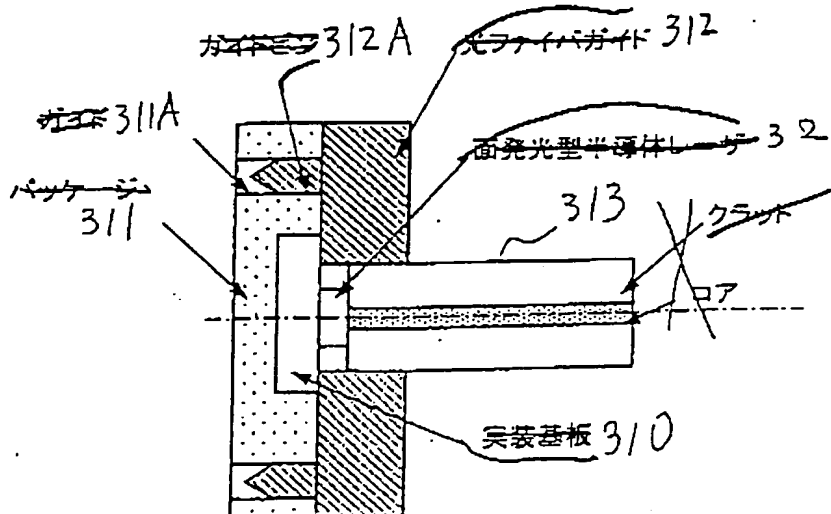
FIG 97B

(B)



~~[81]~~
 98

FIG 98



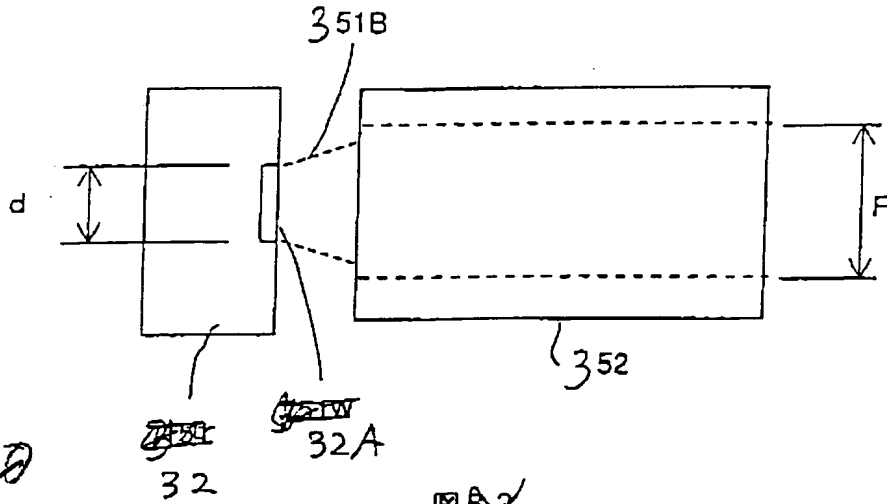
81

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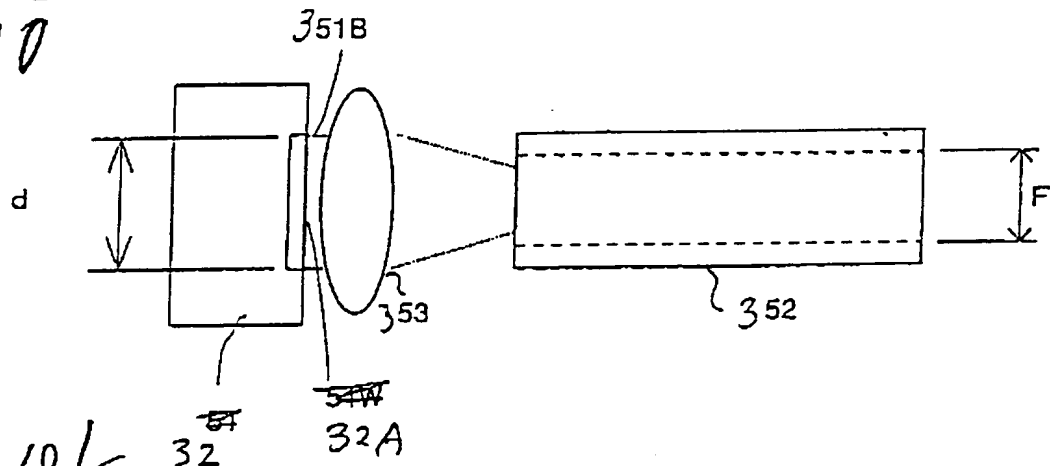
77
~~FIG 99~~

FIG 99



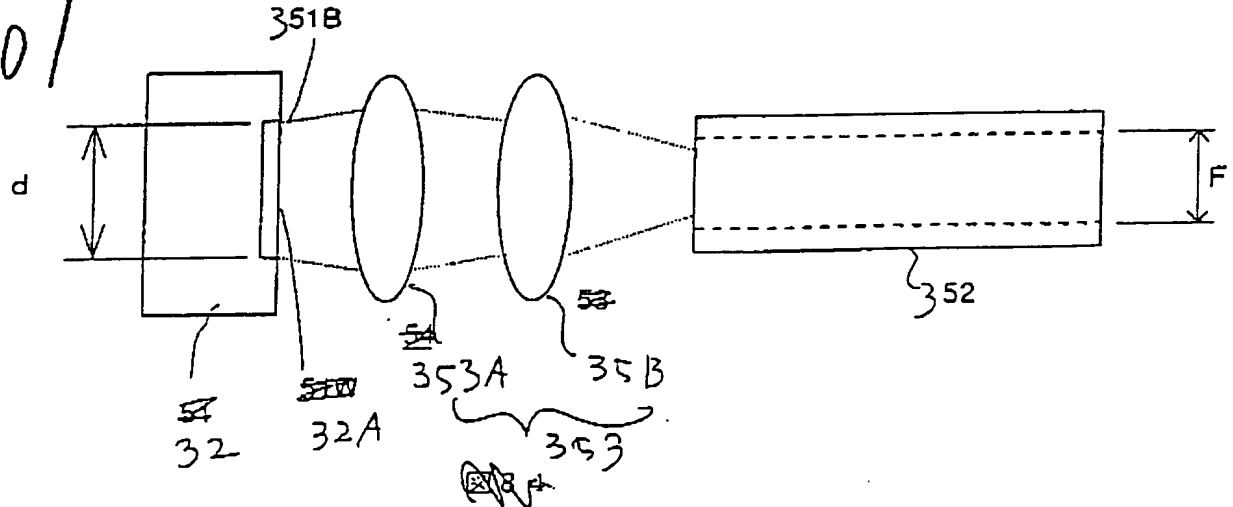
100
~~FIG 100~~

FIG 100



101
~~FIG 101~~

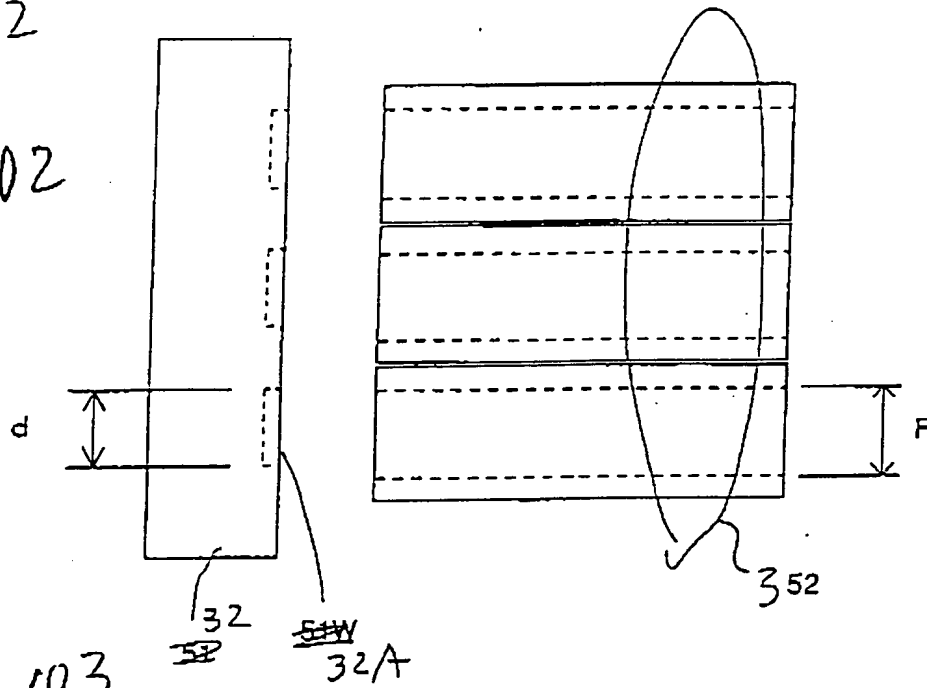
FIG 101



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[13 888]
102

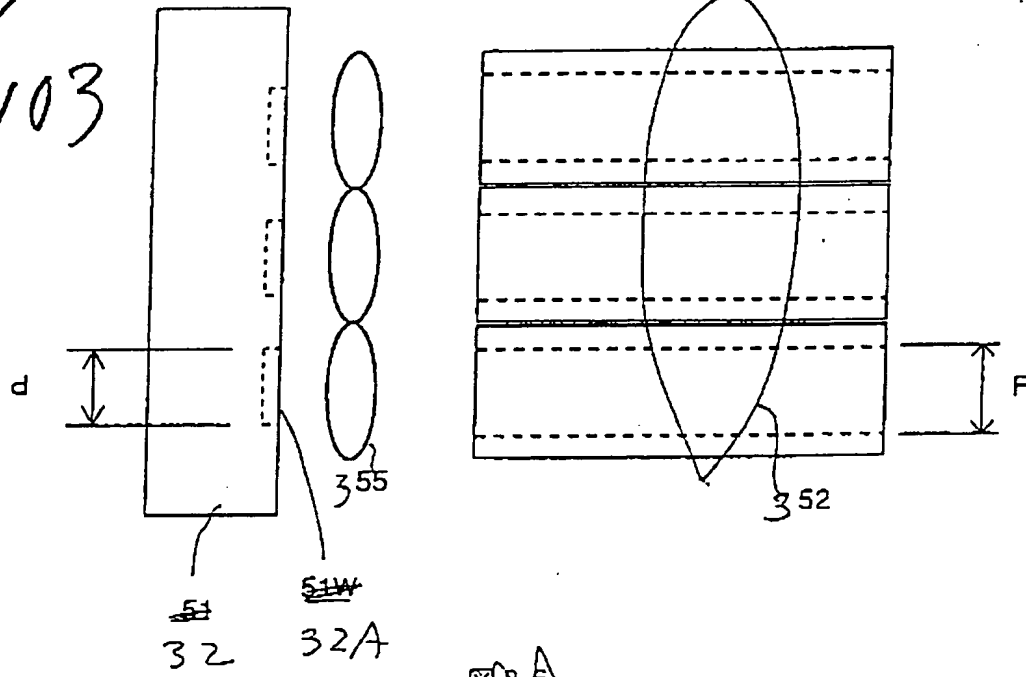
F/G/102



712/

103
[13 888]

F/G/103



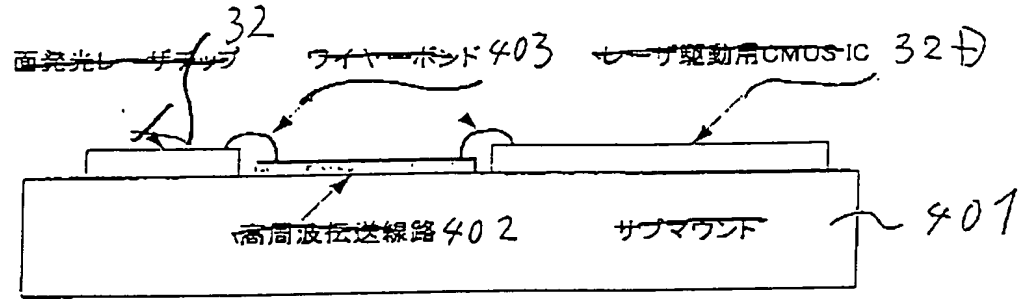
8/5

8/5

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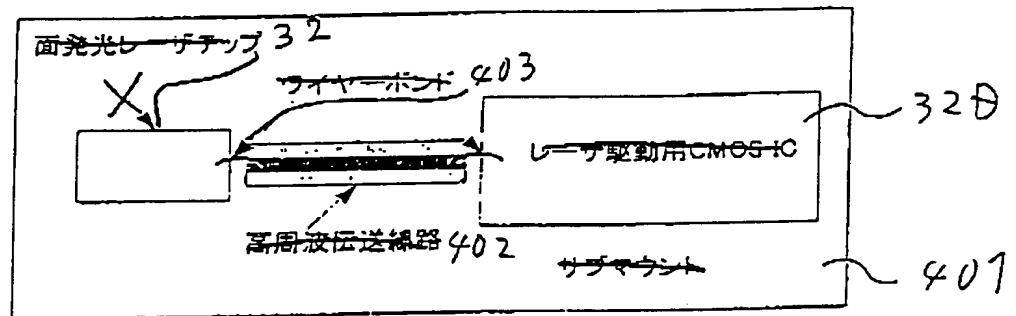
22

[2] 8/11
104
FIG 104A
(A)



102

FIG 104B
(B)



105
[2] 8/8

(b)
図 8

24

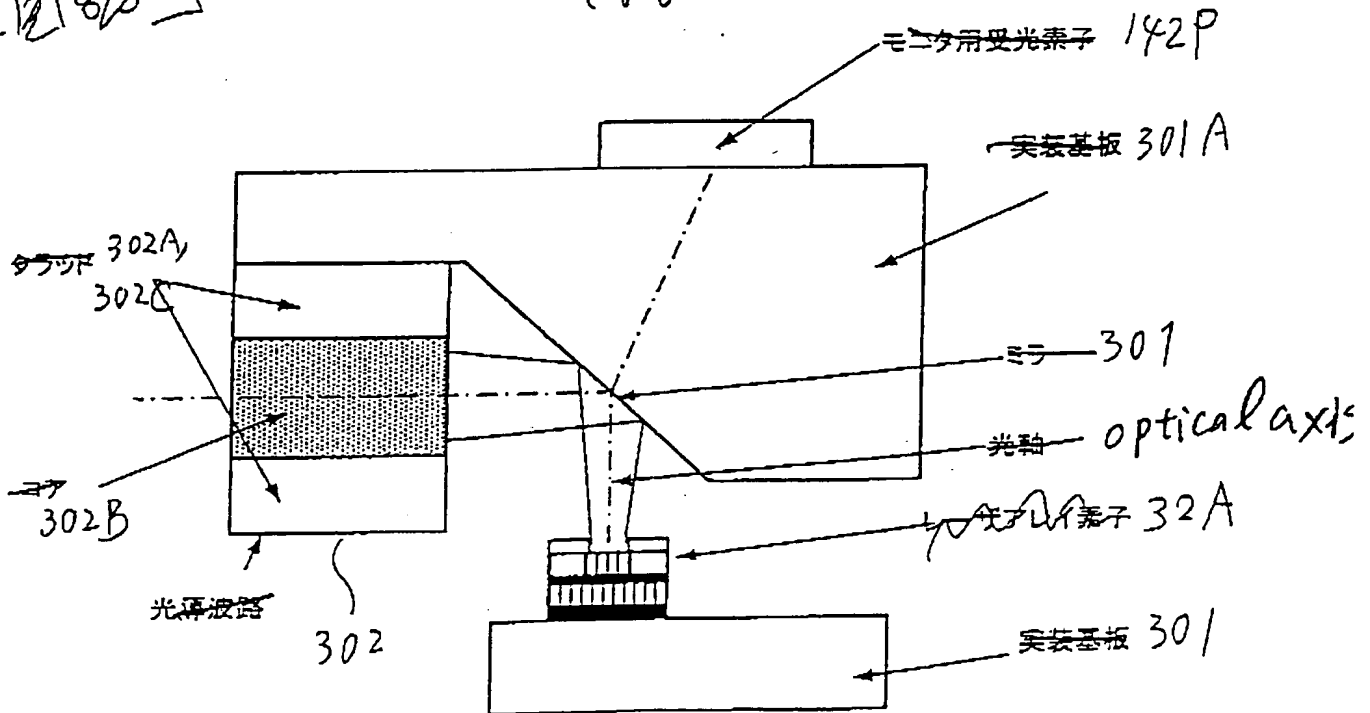


図 8-8

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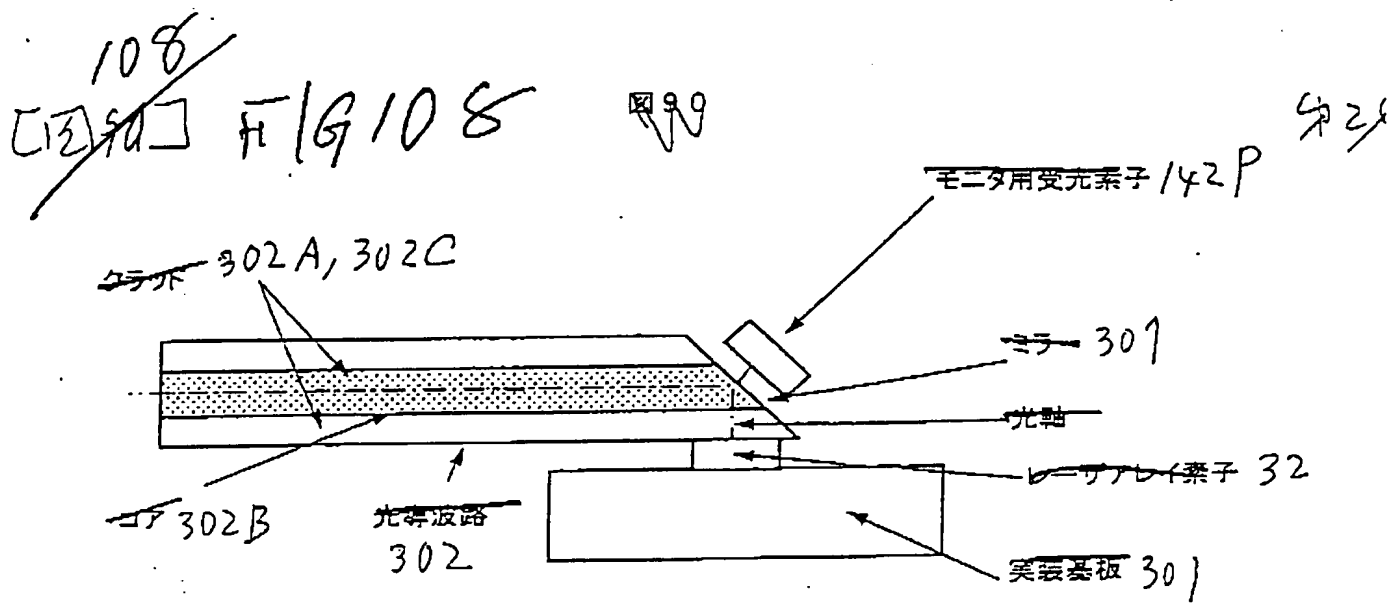
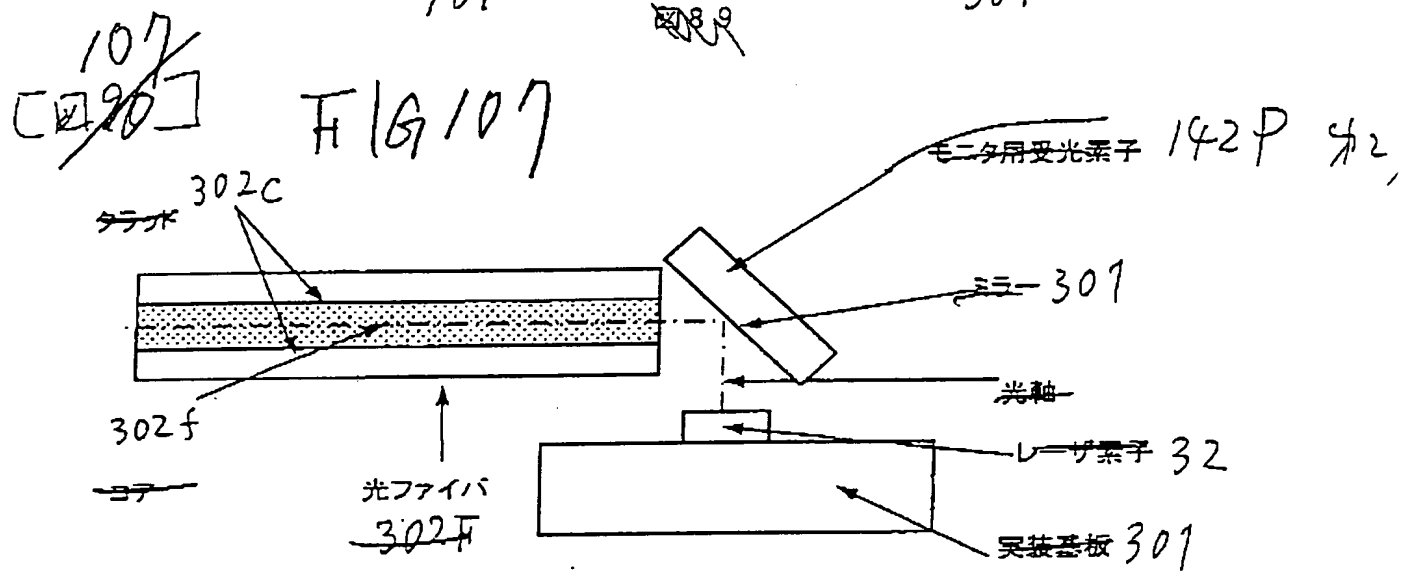
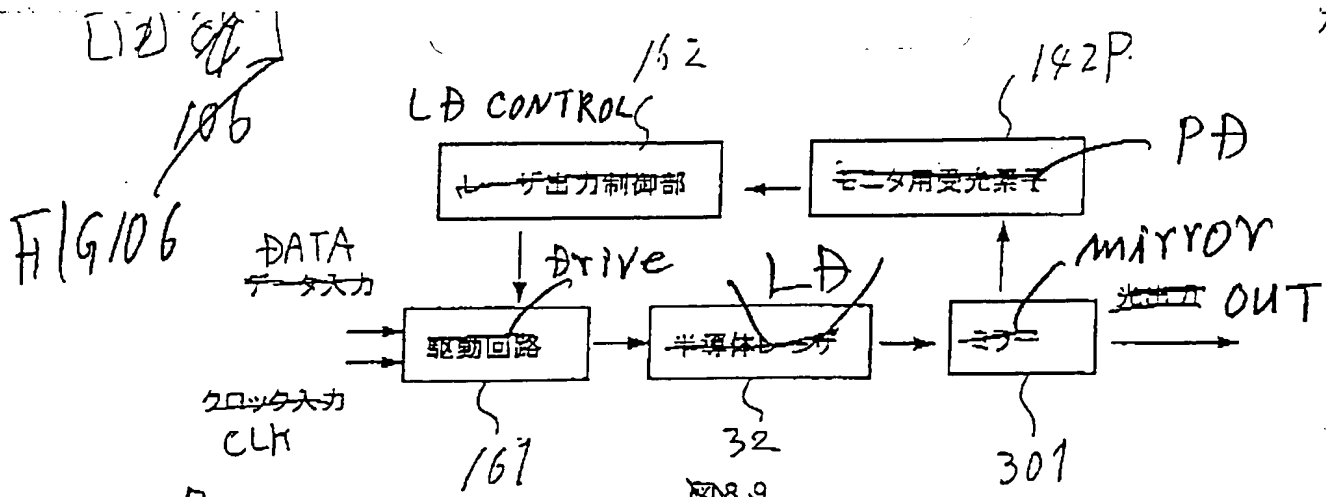


FIG 109

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425

~~[12 92]~~
109
FIG 109

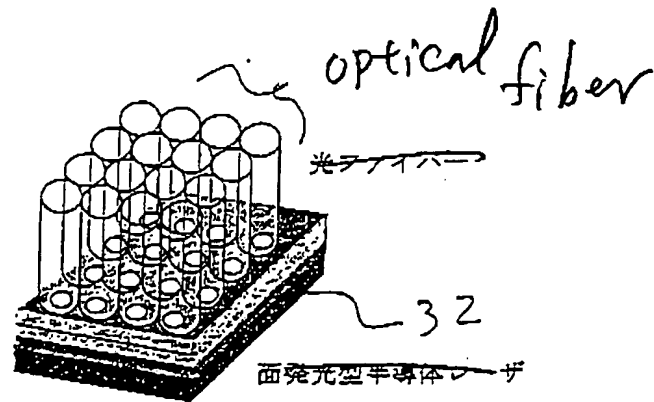
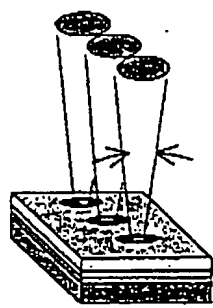
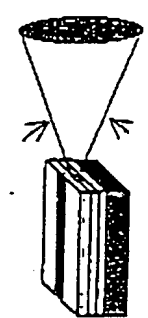


図 92

110
~~[12 96]~~
FIG 110 A
(A)



(B)



(a) 面発光型半導体 (b) 端面発光型半導体

図 93

425

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[E] 94
111

FIG 111A

(A)

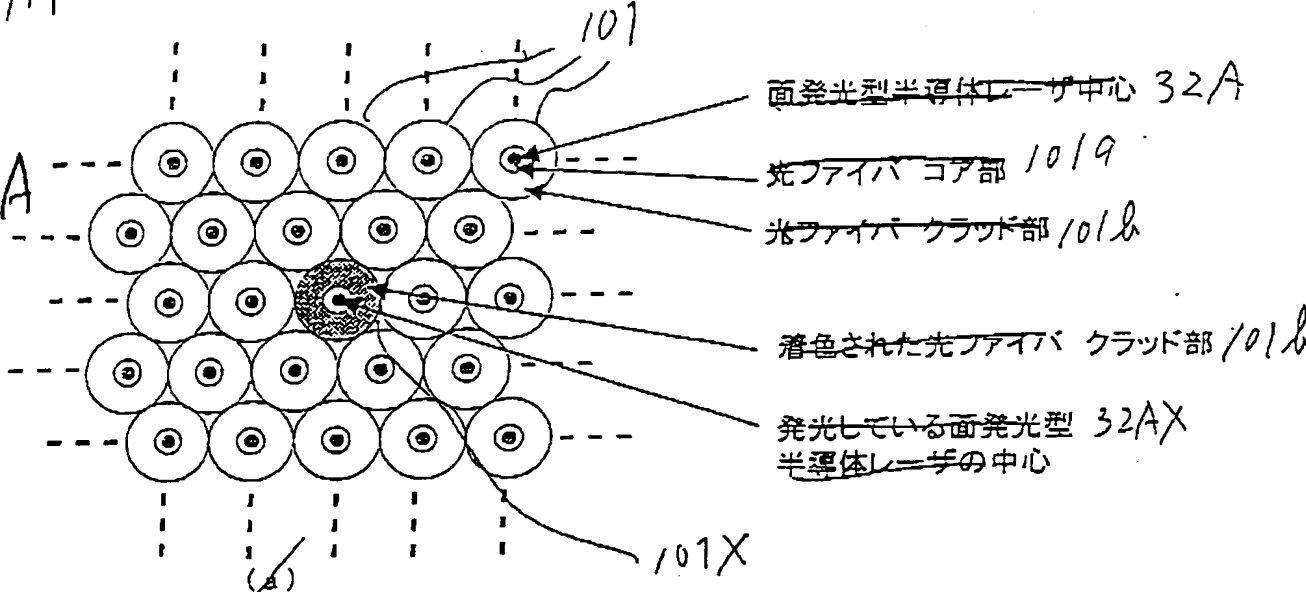


FIG 111B

(B)

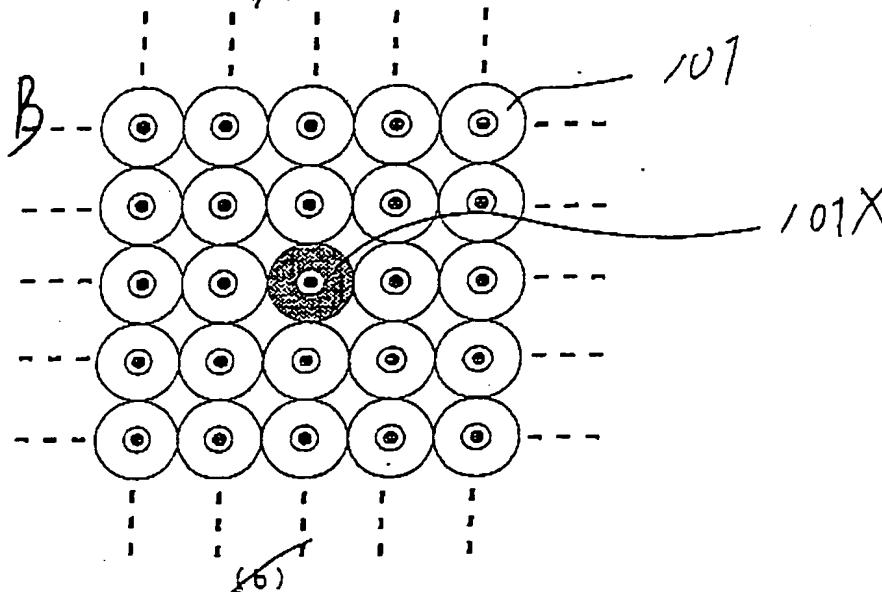


FIG 111C

(C)

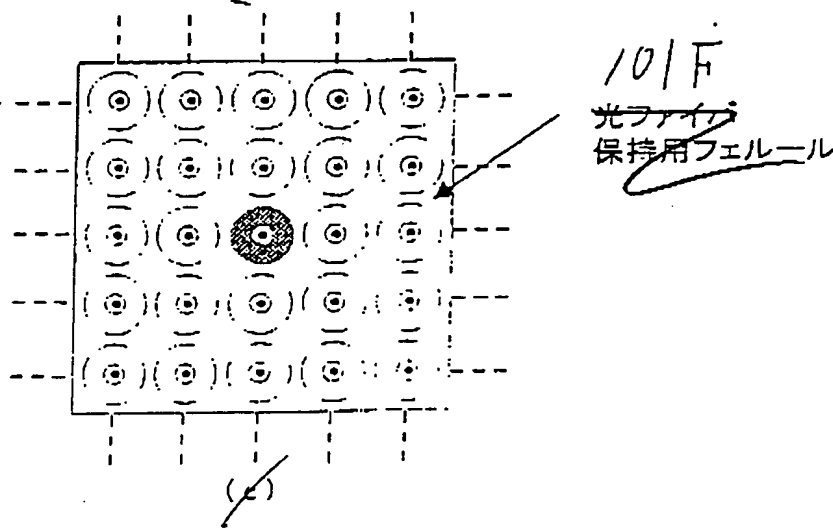


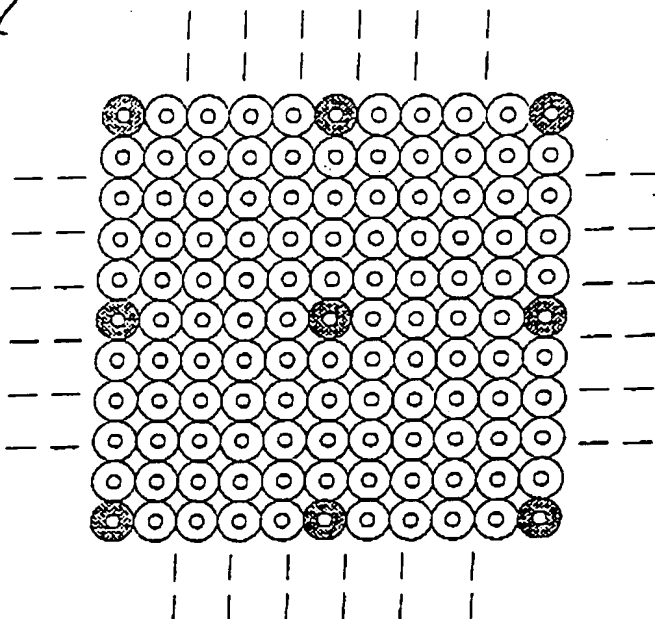
図 9 4

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112
~~112~~
~~95~~

FIG 112

425



113
~~113~~
~~96~~

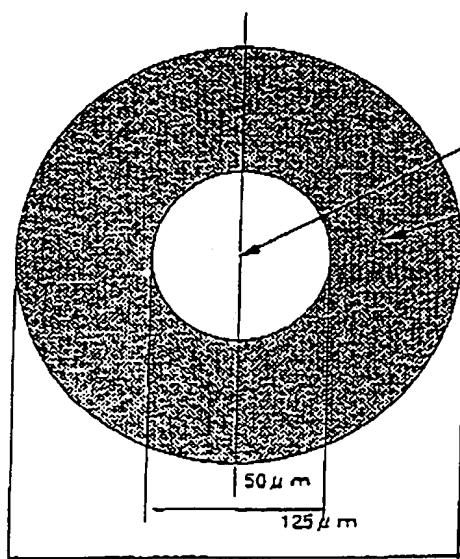
95

(A) FIG 113A

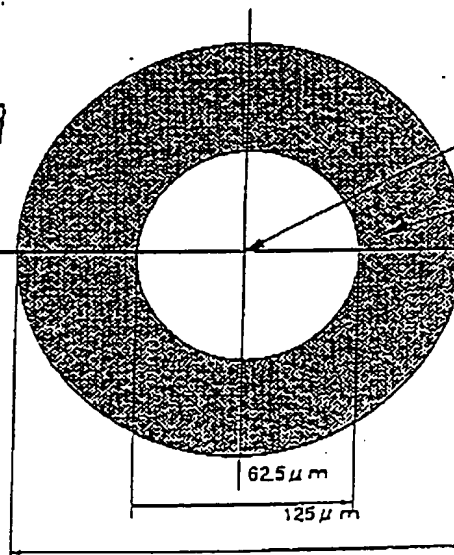
425

FIG 113B

(B)



1019
 1018



1019
 1018

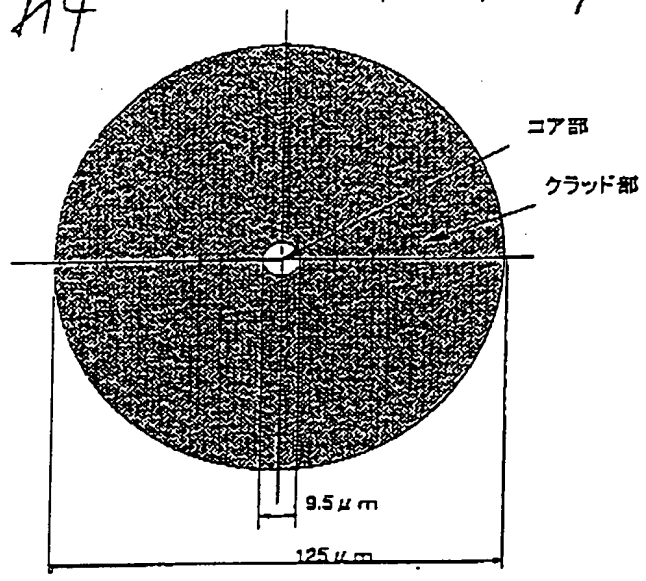
96

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~~FIG 114~~
 114

FIG 114

25

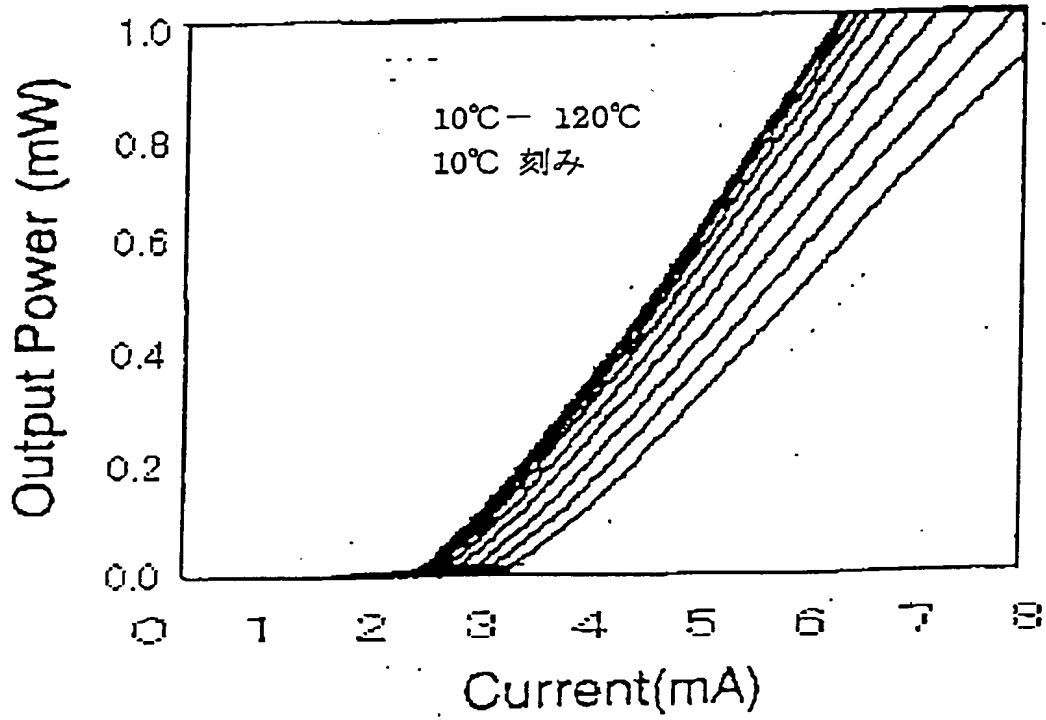


~~FIG 115~~
 115

~~FIG 115~~

FIG 115

26



~~FIG 115~~

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116
[12/98]

F/G/116

Optical Upper Limit

光出力上限

Optical Lower Limit

光出力下限

光出力変動範囲

Temperature

温度下限

Upper Limit

Temperature

温度上限

Lower Limit

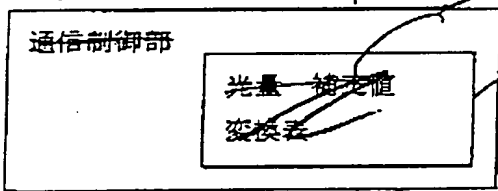
Current
電流 a
電流 b
電流 x
Current

117 F/G/117
[12/100]

図 9.9

COMMUNICATION CONTROL

CONVERSION TABLE



LD CONTROL

受光検出部

CURRENT SOURCE

PD PROC

受光素子 412

半導体レーザ

32

410

ハーフミラー 411

図 100

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[12] ~~117~~ H19/18

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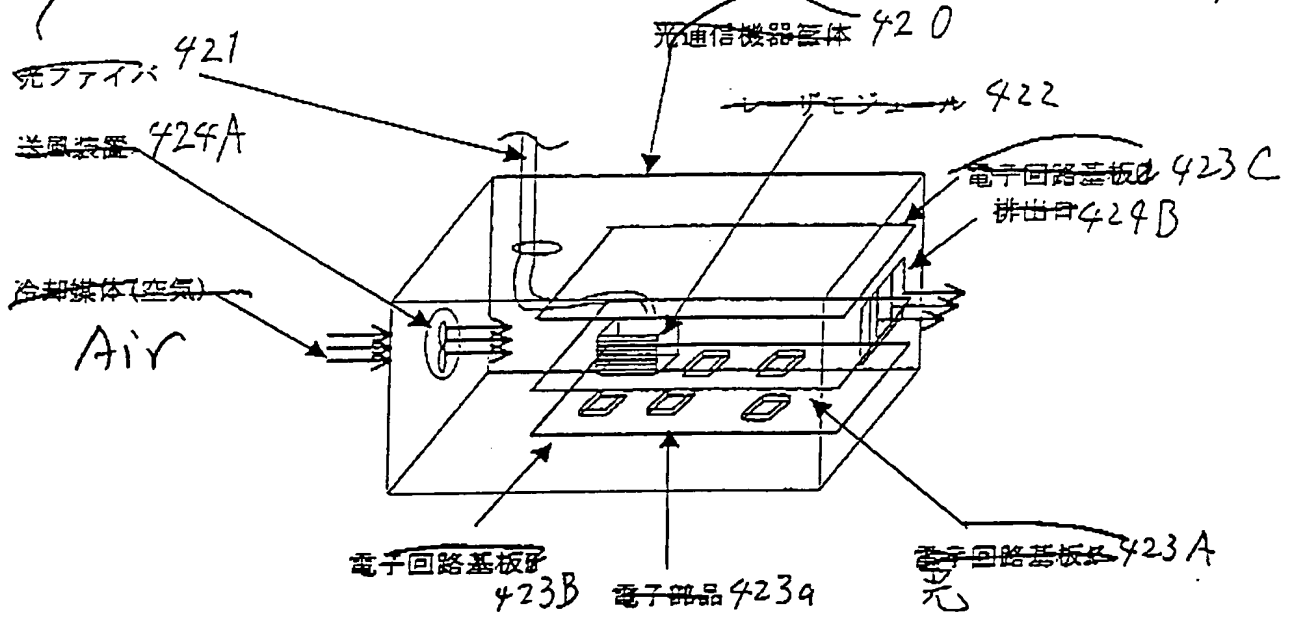


図19

[12] ~~119~~ F19/19

第29

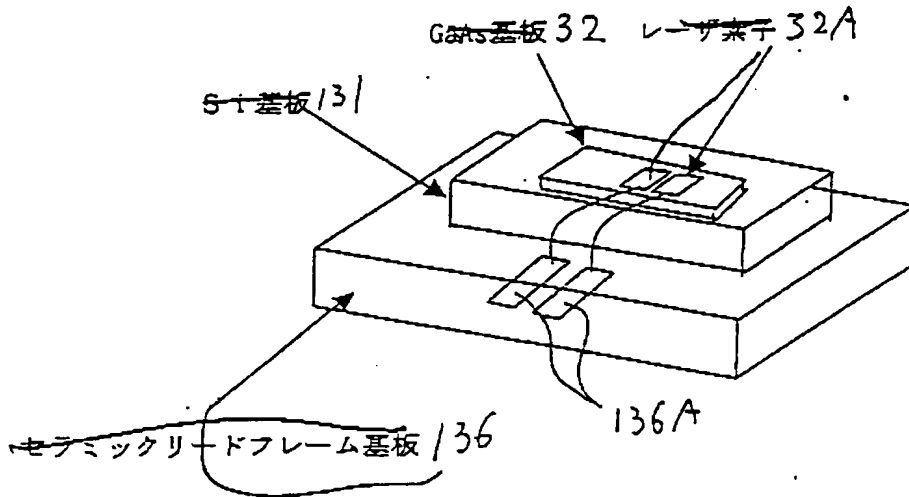


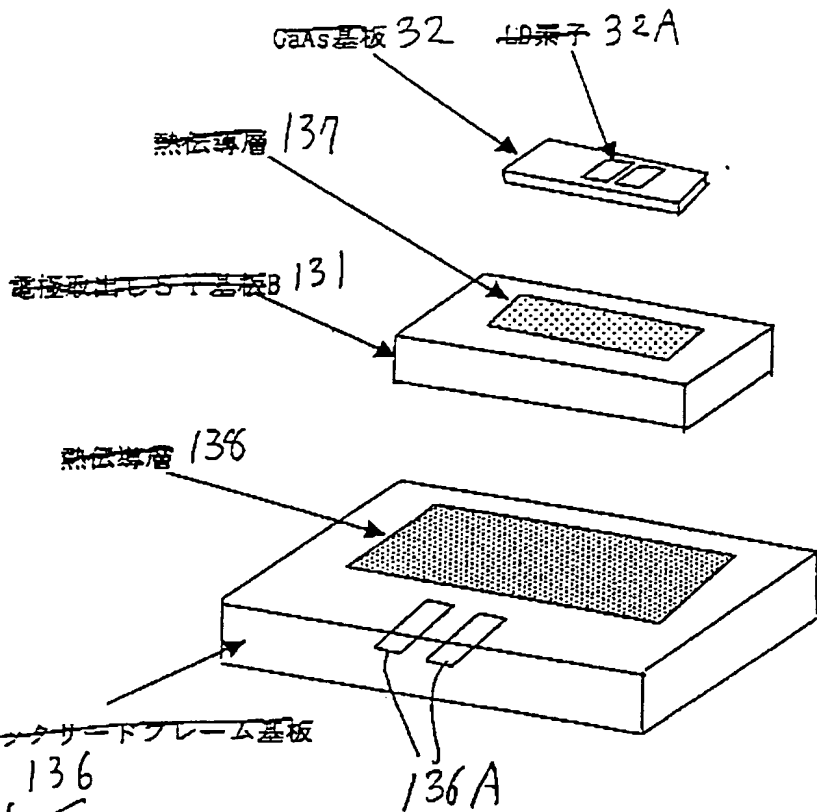
図20

10085204, 022602

120
~~121~~
 123

H/G/120

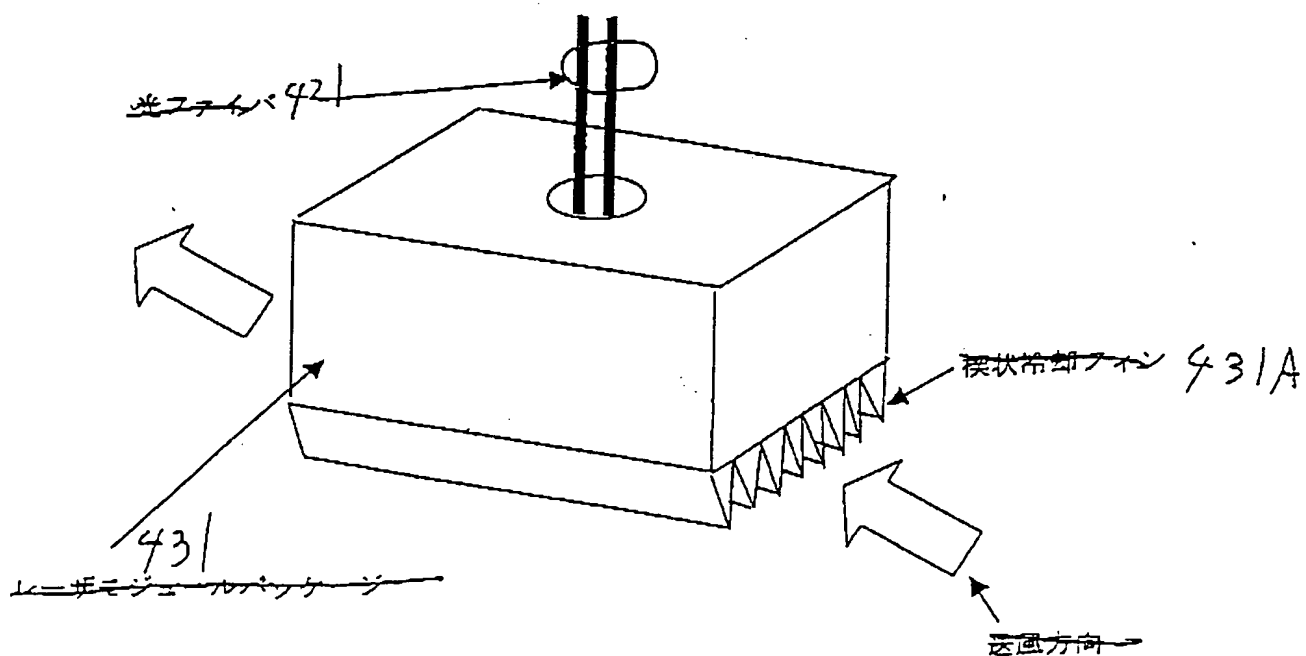
カ29



121
~~122~~
 124

図108

カ29

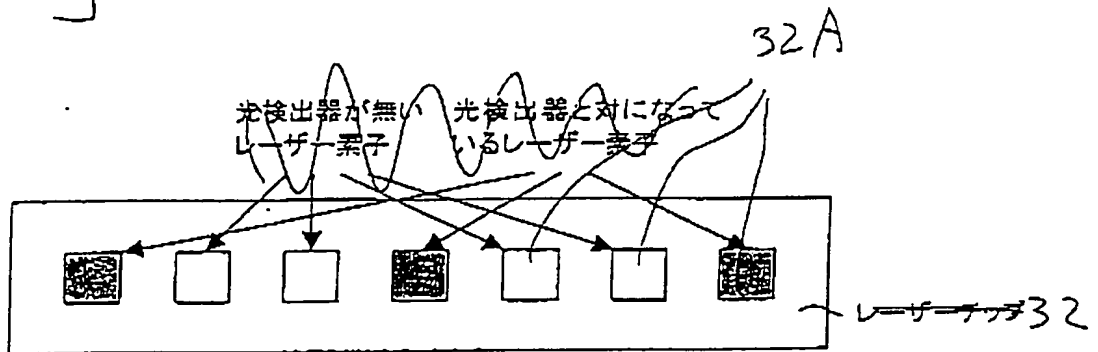


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430

122
~~[12/105]~~

FIG 122



123
~~[12/106]~~

FIG 123

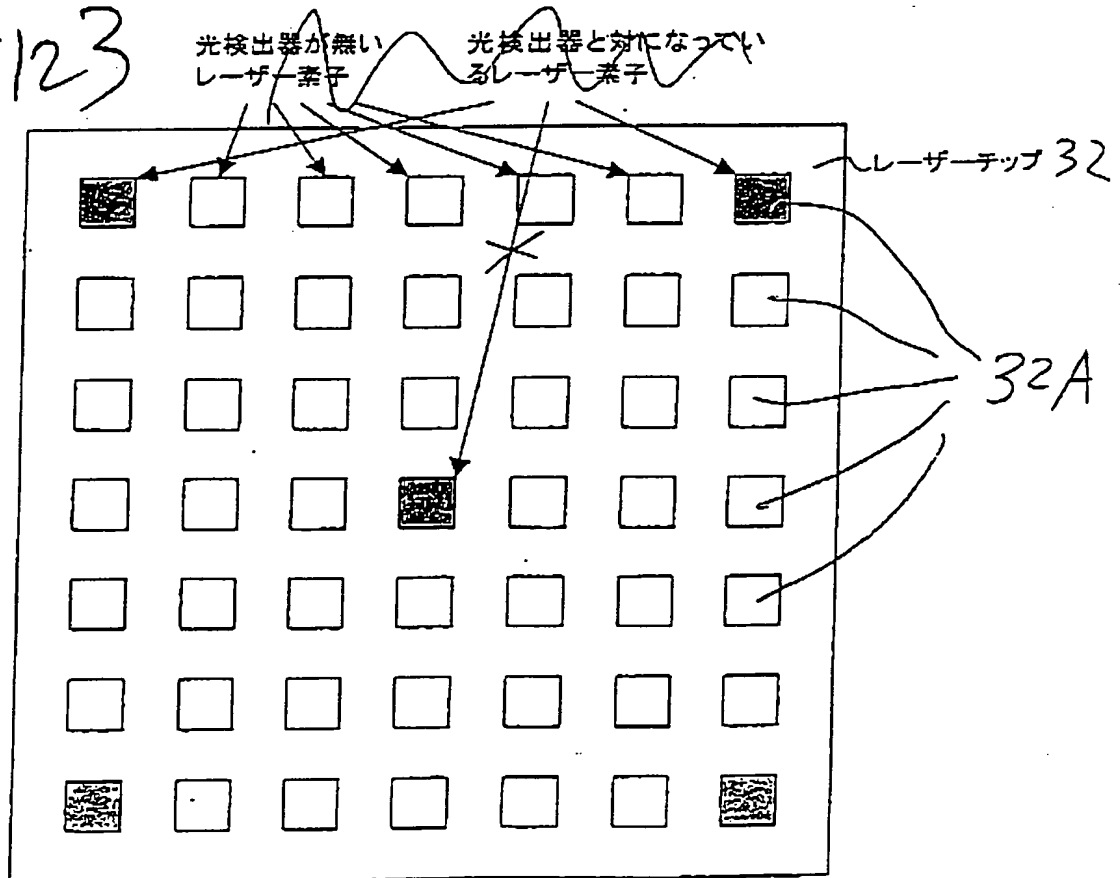
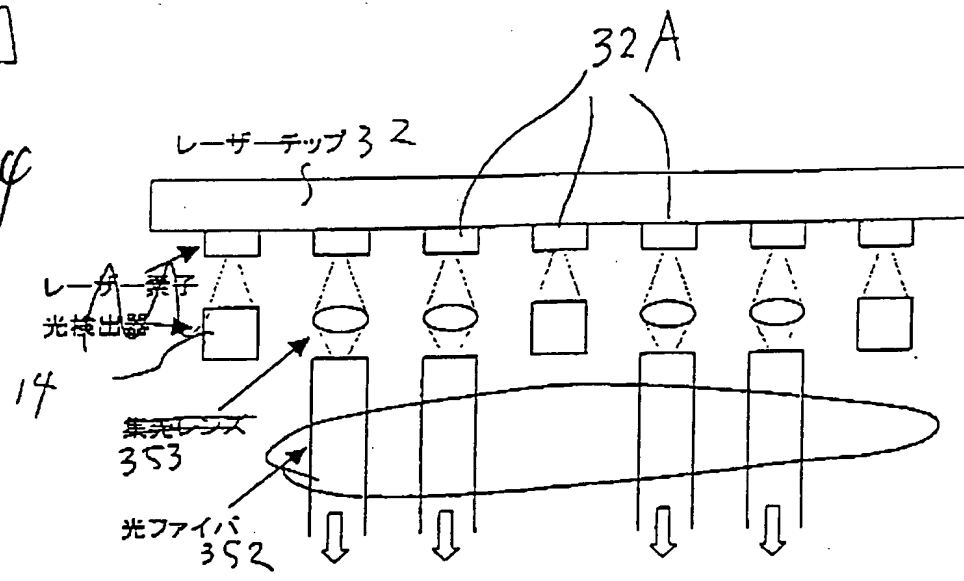


FIG 106

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30

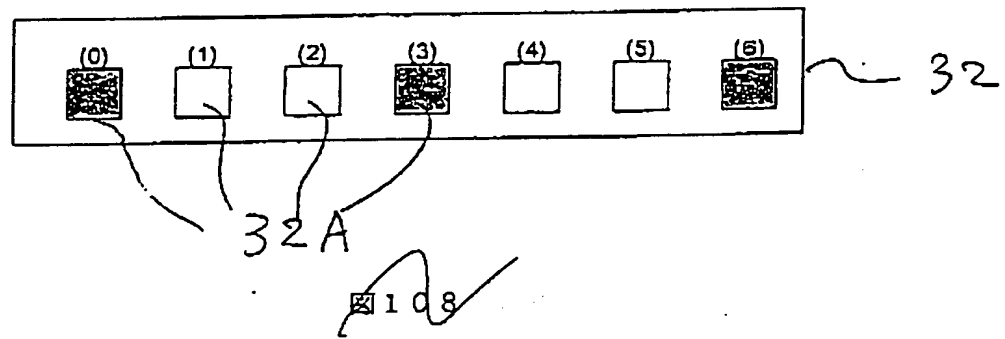
124
~~[124]~~
 F/G/24



125
~~[125]~~

F/G/25

107



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[12/14/97]
126

930

FIG 126

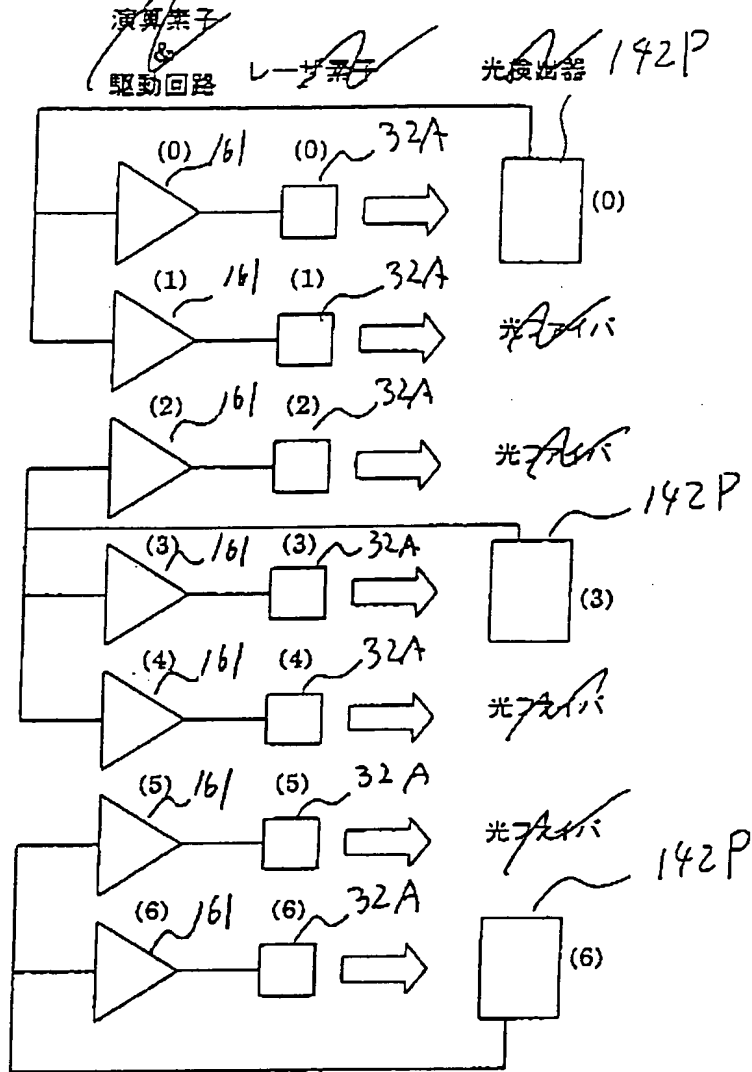


図 126

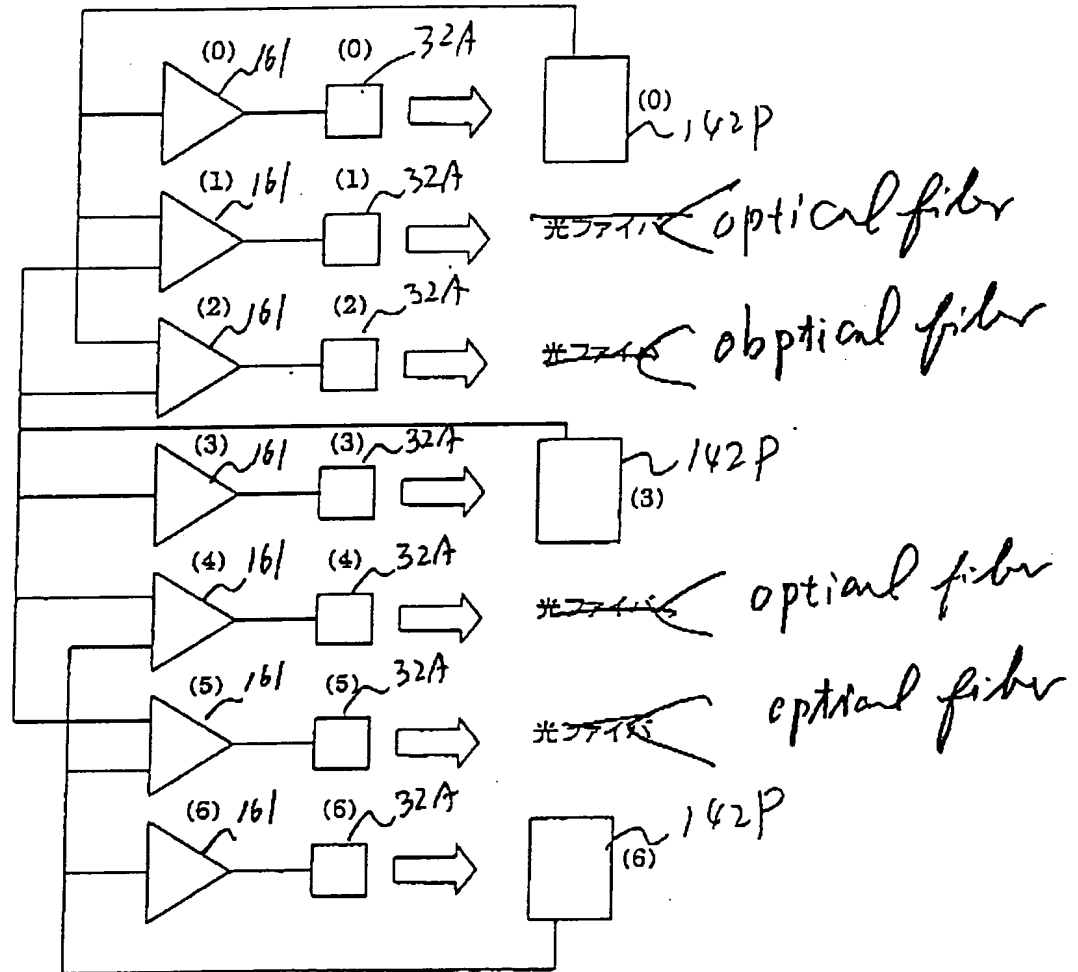
10085204, 022602

30

[2] #0
129

FIG 127

演算素子 & レーザ素子 光検出器



129

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30

[12] 424
128

F/G/28

32A

(00)	(01)	(02)	(03)	(04)
(10)	(11)	(12)	(13)	(14)
(20)	(21)	(22)	(23)	(24)
(30)	(31)	(32)	(33)	(34)
(40)	(41)	(42)	(43)	(44)

32

111

[12] 422
129

F/G/29

32A

(00)	(01)	(02)	(03)	(04)
(10)	(11)	(12)	(13)	(14)
(20)	(21)	(22)	(23)	(24)
(30)	(31)	(32)	(33)	(34)
(40)	(41)	(42)	(43)	(44)

32

112

209220"4025800T

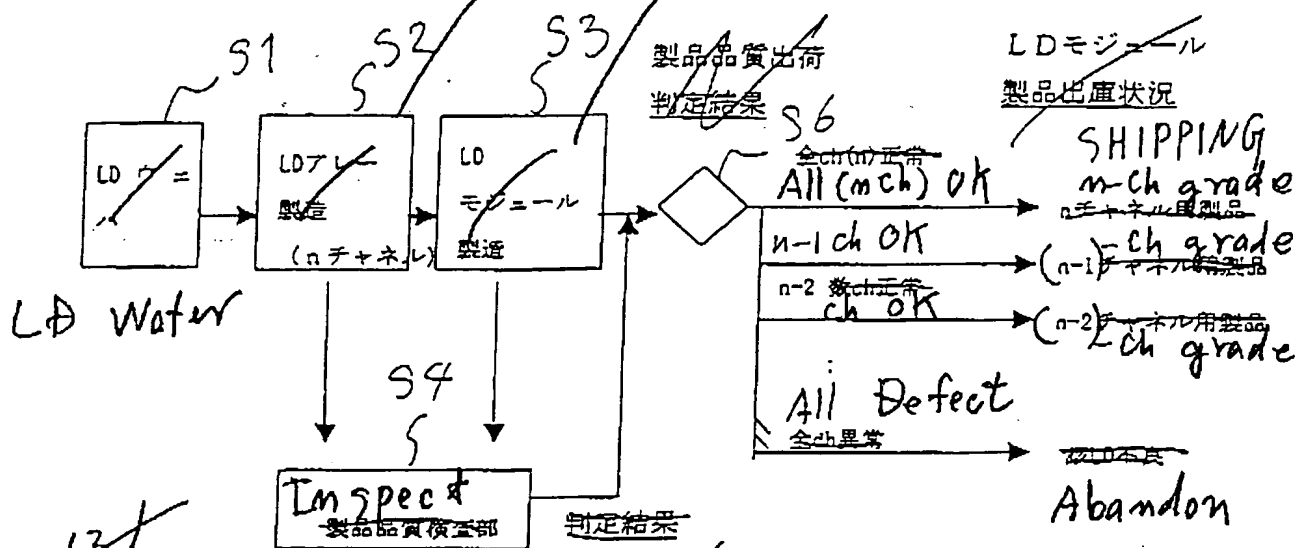
130
[12/13]

FIG 130

LD array

Array Module

A31



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[12/13]

FIG 131

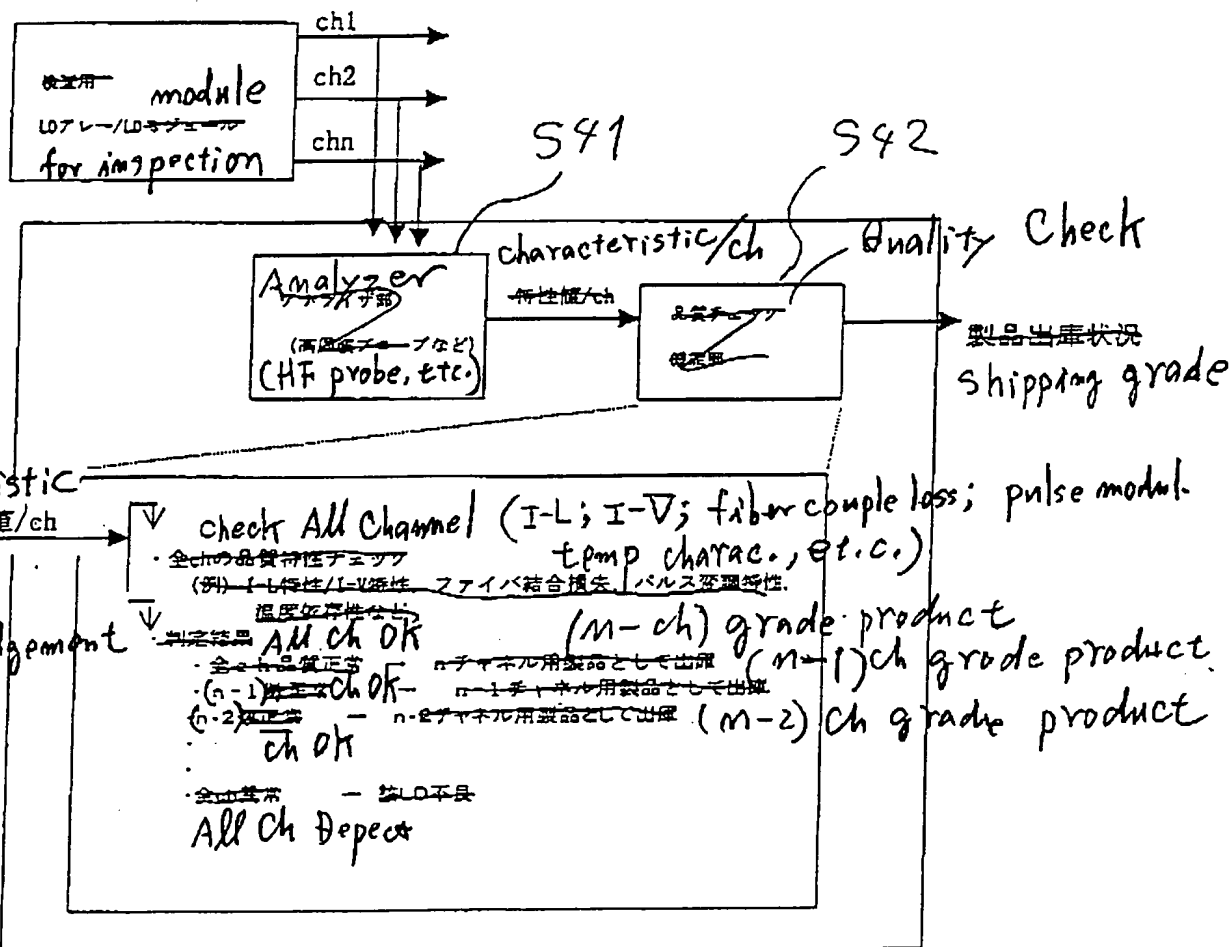


FIG 134

10085204, 022602